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ORIGINAL ARTICLES.

THE STRUGGLE OF THE BODY AGAINST TUBERCULOSIS AND ITS IMMUNIZATION.*

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I.

I WISH at first to express my hearty thanks to the committee of organization of the Congress, which, in asking me to hold the conference at the general assembly, has done me the honor to permit me to represent my country in its scientific aspect.

I would like to speak to you upon subjects relative to tuberculosis, and I have chosen that one to which for more than thirty years I have devoted, both in the laboratory and the clinic, the best efforts of my mind.

The existence of an antitoxin for tuberculosis and the possibility of its application to the cure of tuberculosis, was announced for the first time by me in Bordeaux, in 1895. The truth which I announced was the object of many discussions; it is, however, thanks to the successive labors of many savants, a definite addition to science. Many workers in laboratories, among others, Behring and Arloing, have verified the possibility of obtaining a true *tuberculosis* antitoxin from animals, and a host of physicians have recognized its practical application in the treatment of human tuberculosis, and its efficacy when the disease is in a stage that is not too far advanced.

To-day I wish to call your attention to a problem of a higher order even than that of the cure of tuberculosis, and to speak to you of the natural means that the body possesses and employs to combat this disease, and of the means by which one can create in it an artificial immunity against tuberculosis.

This is the problem which for some years has held my attention and on which I propose to speak, pointing out in this thesis the results that have thus far been obtained.

I must, in the first place, tell you that these results are the fruit of the labors, not only of one person, but of a school. They are, in fact, the experimental and clinical researches publicly carried on, either in my Medical Clinic or in the Institute for the Study of Infectious Diseases which I founded and where a band of eager workers find at their disposal all necessary material for their research work, observation, and experiments.

There is a fact that always gives food for reflection to those who are interested in tuberculosis; viz., in spite of the enormous diffusion of

the tubercle bacillus in the midst of cities, a great many persons remain unaffected by the terrible disease.

Experimental pathology, it is true, has demonstrated that no absolute immunity exists, if very large quantities of a virulent culture be introduced into the body. But to carry this proposition into actual practice is not permissible. Is it not just, on the other hand, to state that never does one verify in spontaneous infections what happens in those that are experimentally induced, where one injects into the veins large quantities of the tubercle bacillus?

For the number of pathogenic micro-organisms introduced at one time, and the avenues of entrance are two factors by no means to be neglected in the induction of an infectious process. The blood offers, as is well known, the most favorable means for a rapid diffusion of the bacillus.

This is the reason why, in spite of the possibility of artificially infecting any organism whatsoever, it is proved by experience that it is no less true, that a great many persons exposed to the tubercle bacillus remain free from infection, and that we physicians ought to recognize clinically and practically, the existence of a certain class of persons possessing a natural immunity towards tuberculosis, such as we would like to establish in the human body.

In view of the facts we must ask ourselves why this immunity is possessed by some, and does not exist for others, and by what circumstances it can be strengthened or made to disappear. It is to the study of this problem that my coworkers and I have directed our attention.

I will first tell you what was our point of departure. We ought, in the study of the pathology of the products of disease caused by tuberculous infection—as in that of the greater number of infectious diseases—consider on the one hand the tuberculous poisons created by the changes in the tissues and the plasma of the body, and on the other the bacillus that produces these poisons.

Tuberculous poisons have a double origin, a part are the secretions of the bacillus during its period of biological activity; the others are enclosed in the protoplasm of their own bodies. These latter are of special importance, as the dead bacilli can create in the tissues similar changes to those created by the active and living bacilli; and it is just by means of these latter poisons that the dead bacilli exercise such power.

Their poison, as I have been able to demonstrate by a series of researches already well known, and of which I gave a full account to the French Congress on Tuberculosis, in Paris, in 1898, can be completely withdrawn from the

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bodies of the bacilli, by a prolonged boiling in water. They show a pathogenic and necrotic power over the tissues with which they come in contact.

Among our researches, I will mention particularly those of one of my associates, Dr. Badano, who has demonstrated that the poisons of the bodies of the bacilli injected into the trachea cause the development of areas of bronchopneumonia in the lungs of animals.

To be able to defend itself victoriously against the attacks of the tubercle bacillus, it is necessary that the body should, at the same time, neutralize the tuberculous poisons, prevent the multiplication of the bacilli, and destroy those that have already found their way into the organism.

I place, as of first importance, the neutralizations of the tuberculous poisons, expecting that if this condition is not met, these poisons, by altering the character of the tissues, will create a soil still more favorable for the development of the bacillus.

We have proved this by a very simple experiment. When one injects into the thigh of a guinea-pig a small quantity of tuberculous poisons, $\frac{1}{10}$ c.cm., and if one inoculates the animal at the same time with a small dose of an active and virulent culture, the bacillus infection proceeds much more rapidly in the infected animal than in the controls.

Does an organism in a good physiological condition possess a means of defense against tuberculosis?

In order to answer this question, we have recourse to a series of researches intended to show whether the sera of different animals do not contain antitoxic materials that neutralize the tuberculous poisons. These fundamental researches were only made possible by my work upon tuberculous poisons.

In short, I found myself balked at the beginning of my studies with an inactive principle with which it would have been impossible to kill the healthy guinea-pig, by means of these poisons. I used at that time a product that was inconstant in its nature, vacillating in its toxic quality, and imperfectly specific; varying because the richness in toxic material is variable from one culture to another, imperfectly specific because the 50 per cent. glycerin contained in the tuberculin modified its specific character, the glycerin being in itself a toxic product. But we succeeded by our studies in providing ourselves with a product whose dose was constant, having 100 toxic units to the cubic centimeter; that is to say, in a cubic centimeter a subcutaneous injection would surely kill a guinea-pig weighing 100 grams.

Having thus reduced the power of killing to an exact art, for we possessed a sure specific poison, and an exact method of dosage, it now remained to see whether the serum of man and of animals would have any neutralizing power when used in the guinea-pig; and if so to calculate exactly the antitoxic value of the different sera.

These experiments have shown us that the serum of robust and healthy men, contains positively defensive elements, for a dose of tuberculous poison that would be surely fatal in a guinea-pig is no longer so, when it is first mixed with a certain quantity of human serum. In repeating the experiments with the serums of different healthy animals, we have found that some do, and others do not, possess this antitoxic property; we find that human serum stands the highest in the scale of antitoxic power. That of the cow, calf, dog, cat, stag, horse, and above all of the turkey and the pig also contain antitoxic elements in different proportions. There is, however, no trace of them in the sera of the guinea-pig and rabbit.

Relative to the bacilli we have found that the same sera of healthy subjects if added in different proportions to the cultures were capable of influencing their development, and we have really found that several of them exercised a very decided influence, and have prevented the development of the bacilli.

The most powerful sera are those of the man, of the pig and the calf, then come those of the cow, the horse, the dog, the ass, the stag, and the rabbit, while the power of that of the guinea-pig is reduced to zero. The bacillus of tuberculosis may be even cultivated with ease in the pure serum of the guinea-pig.

The sera of the animals just mentioned, are endowed with still another property, that of agglutinating homogeneous cultures of the tubercle bacillus, according to the methods of Arloing and Courmont, which is the surest. This fact, affirmed by Arloing and Courmont, has been clearly confirmed by my own researches. The sera of the horse, the ass, the stag, the sheep, the dog, and the rabbit all possess a certain power, more or less marked, of agglutination. That of the guinea-pig, on the contrary, does not as a rule, possess it at all.

Agglutination, it is useless to call it in question, is the expression of a process of immunization, of a special defensive energy of the organism, as I have understood from the publication of the works of Widal on agglutination in typhoid fevers, a phenomenon which the author interprets as a reaction to infection.

Tuberculosis does not escape this law, which is to-day universally admitted. Koch himself expressed the opinion that agglutination in tuberculosis would be the exponent of the immunizing reaction. This phenomenon is, in fact, related to the presence in the circulation of substances that exercise a particular action on the bacillus of tuberculosis.

The agglutinating power is thus a new proof of the existence of defensive materials in animals. The serum of a healthy man, showing no actual sign of tuberculosis also possesses a certain power of agglutination. This last proposition, affirmed first by Arloing has been confirmed by our own experiments, in our Institute, and by those of Romberg, at Marburg.

But in addition to these energies that the animal organization usually possesses to defend itself against tuberculosis, there exist others whose existence is induced by the presence of the bacilli and their poisons. These are represented—as I can affirm after a long series of experiments undertaken for several years, on different animals, and published in 1895, and continued to this day—by the extraordinary production of antitoxins, by bacteriolysins and agglutinins.

If one determines, according to my method, the antitoxic power of the blood of an animal, as opposed to tuberculous poisons, and then inoculates it methodically with small quantities of these poisons, one sees, at the end of a certain time, that the antitoxic power of its serum increases considerably. We have verified this fact in the dog, the ass, the horse, the stag, the sheep, the cow, and last, in man. This increment of antitoxic power, which may be perceived at the end of a month, becomes considerably greater, so much so, that in several horses that started with only 100 to 200 antitoxic units to the centimeter, the increase amount progressively to 1,000, 2,000, 4,000, and 8,000. I have established the fact that in a healthy man, at the end of a month of regular inoculations, the antitoxic units can be raised to double or triple the amount of those at the beginning of the treatment. This ability of the human organism to produce, as a defensive reaction against tuberculous poisons, defensive antitoxic elements, is a fact that is to-day universally admitted. Perhaps it has not been forgotten that I was the first to demonstrate it, at a time when the possibility of obtaining a tuberculous antitoxin was not even suspected.

What I stated for the first time in the month of August, 1895, in Bordeaux and London, was confirmed by numerous observers, among whom was Behring, who repeated it in several communications, notably in that to the Congress of Hygiene in Madrid, 1898.

And if some few observers failed to obtain the same results, it was the fault of technical errors arising largely from the use of glycerinized tuberculin. It happened in some instances that the experimenters injected into their guinea-pig along with the tuberculous poisons, toxic quantities of glycerin, which destroyed the value of their results.

The introduction of the bacteria into the organism stimulates in the same way the development of these new bactericidal energies. It was evident when an animal was injected with my aqueous tuberculin—which was nothing more than aqueous extract of the bodies of the bacilli—that this development was really an inoculation of dried or living bacilli. The latter particularly when they are prepared in a convenient form, start up in the inoculated animals, a formation of substances that are strongly bactericidal.

This may be proved in different ways. The blood of different animals is collected, and is tested to see whether the living virulent bacilli lose their vitality from contact with serum that

is suitably prepared. The object of the research in such cases, is to see, whether, and in what proportions, the sera added to the culture modify the development, whether the bacilli once brought in contact with the sera, can thereafter develop regularly. In short, whether the bacilli, after coming in contact with the sera for a greater or lesser time show any of those necrobiotic changes that are characteristic of their death and destruction as studied in my Institute. By all these experiments we have been able to prove that the sera of all animals treated with different tuberculous materials, possess to a greater or less degree, a baneful action upon the bacilli of tuberculosis.

The first series of experiments show clearly that the bactericidal action is due to substances developed in the animal that furnished the serum that contained them in solution. It deals with a destruction of the bacilli, that has nothing in common with other organic energies, such as those presented by the phagocytes, and other tissue elements.

This does not, however, prevent me from admitting the rôle that the leucocytes and the organic elements may play in the formation of these substances, also the destruction that the leucocytes and these cellular elements exercise on the tubercle bacilli; but I maintain simply the undeniable fact that in the serum of inoculated animals there is found, as I have said, certain substances in solution that are capable of nullifying the vitality of the bacilli, and causing their destruction.

In connection with the second series of experiments we studied the power that the serum had of depriving the tubercle bacilli of their infectious properties. In order to demonstrate this fact we inoculated guinea-pigs with virulent bacilli that had been kept in contact with the serum for a varying length of time and after preparing controls waited for the development of the infection. We succeeded by these methods in preventing the development of tuberculosis in guinea-pigs, after an injection of very virulent bacilli, which caused certain infection in the controls.

But I would like to describe still another more striking experiment. We inoculated the peritoneum of a guinea-pig with a certain amount of virulent and active culture, mixed with the suitably prepared serum of a horse. After which, at the end of twenty-four to thirty-six hours, we opened the peritoneal cavity and collected a certain amount of the liquid containing the inoculated bacilli, and used them for the new peritoneal inoculations and to sow the culture tubes. These remained sterile; and as to the inoculated animals they did not take the disease.

The experiences of the controls, however, those that were inoculated but without the addition of the serum, gave positive results.

The dried bodies of the bacilli, and particularly the living bacilli, constitute the material that is the most likely to create in the organism a large quantity of specific bactericidal substance. Viru-

lent cultures of tubercle bacilli injected into the veins of rabbits, along with the serum, remained inert, but there was found a formation both of bactericidal substance and agglutinating materials. Horses, asses, cows, sheep, stags, dogs, rabbits, treated as we have described, have attained a power of agglutination in the proportion of 1 to 400; as for example, in a cow inoculated with the dead bodies of bacilli. This very significant increase in the power of agglutination proves with certainty the development, in great quantity, of protective bodies in the organism of animals treated by means of dried bacilli, or those that are living and active.

By comparing the agglutinating power of the serum in animals inoculated with tuberculous poisons, with that of animals treated with the bodies of the bacilli, we have found that the agglutinating power is much stronger in the second case, while the antitoxic power shows itself much more intensely in the animals submitted to injections of poisons.

These experiments tend to show that in the animal organism tuberculous poisons incite the formation of antitoxins, and that it is the bacilli that give rise to the development of these antibodies, making up a highly defensive sum of energies.

We also undertook a series of researches to study the fate of the active living bacteria when they were inoculated under the skin of animals. By a very simple technic, we periodically probed the place of inoculation, and took away small quantities of subcutaneous material, and we were thus able to follow, with the microscope the morphological modifications of the inoculated bacilli, whose fate it is to be little by little swallowed up by the leucocytes, and to undergo, during a greater or less length of time, various phases of necrobiosis, and at last to disappear completely.

Of all the animals on which we have made the experiments, dogs, asses, rabbits, guinea-pigs and rats, the dog seems to be the one in which the destruction of the inoculated bacilli takes place most rapidly; at the end of five days these latter were to a large extent swallowed by the leucocytes, and in a state of complete bacteriolysis, while in the guinea-pig at the end of the same length of time, not only were the bacilli not yet devoured, but they presented almost the same characteristics as they had done in the culture.

At the same time, bacilli injected in small quantities directly into the lung of a healthy rabbit are doomed to destruction. It is thus proved in the most positive manner by our experimental researches, that there are defensive remedies against tuberculosis; one is represented by the natural energies of the healthy body, which is able to defend itself efficaciously against the bacillus of tuberculosis and its poisons; the other comprises the new energies which we see rushing forth when the bacilli or their poisons penetrate the organism.

Would these defensive energies which are

found physiologically in the body be the effect of reactions produced by latent tuberculous infections of the past that have been ignored? Or might they rather be congenital energies? Or still, might they not be the result of a unique genetic mechanism?

But let us set aside, for the time being, such questions which would lead us into many discussions, and content ourselves at present with knowing that the organism can have no hope of victory in the struggle against tuberculosis, outside of these two classes of defensive energy. So long as these preserve their integrity, the bacilli are destroyed as soon as they enter the organism, and their poisons neutralized, without there being any tangible sign to warn us of the struggle that is going on in its various phases of development, in a certain local circumscribed portion of the body. I have seen a guinea-pig, the animal that is poorest in defensive energies, resist the hypodermic inoculation of small doses of virulent bacilli, and continue to keep well, and even to increase in weight.

But let us suppose that the defensive energies, those that are normal above all, are not quite complete, there is then established a local focus of tuberculosis, and then there develops by an effect of reaction toward this focus, and toward the bacilli that were multiplying and the poisons that they elaborated, reactive energies, and specific means of defense. The bacilli are destroyed, their poisons are neutralized and a spontaneous cure takes place without any other special intervention, and proclaims the victory of the organism over tuberculous infection.

The defensive powers which depend primarily upon conditions of organic soil, tend to disappear when a change in the condition of the soil arises.

I have been able to convince myself, by a series of experiments on individuals weakened by preceding illness, and on subjects whose nutrition was interfered with, either by excessive fatigue, or by insufficient food, that their serum did not possess enough of the materials of organic defense, that is to say that the neutralizing action toward the tuberculous poisons and the inhibiting action toward the bacilli were not up to the standard.

Therefore I have also stated that the defensive resources of the organism of individuals cured spontaneously of tuberculosis, exactly measured according to my method, increases proportionately according to the degree by which they approach complete cure; and that the presence and the proportion of defensive elements in the body keep pace with the variations of the malady as it progresses towards or away from cure.

These experimental researches only go to confirm what the clinical observations have brought into prominence concerning the particular fatality with which tuberculosis attacks women who are pregnant, or in puerperal condition, or who are nursing. These conditions of organic soil differ in various degrees with each subject.

In reckoning the numbers of bacilli contained

in the inoculating fluid we have inoculated 100 guinea-pigs, and 100 rabbits with exactly determined quantities of the tubercle bacilli. We have been able to determine that 10 bacilli could by themselves produce a generalized tuberculosis in certain subjects, while in others the injection of 500 bacilli remained without effect. These differences in results are not possible, unless one takes into account the slight number of bacteria employed, seeing that 500 is but a trifle in the world of infinitely small things. I note this circumstance because, as I have said, there are no organisms that could withstand the direct inoculation of a very strong dose of tubercle bacilli.

The defensive power, moreover, is not even the same in all the other tissues, as I have been convinced by a very interesting series of experiments. When one injects into the veins of a dog, a gram of virulent tubercle bacilli these become localized in the lungs, and create tuberculous foci, which are forthwith spontaneously cured, and in which at the end of a month one can find no trace of the bacilli. On the other hand, in injecting the same quantity of bacilli into the peritoneum, one finds at the end of a month a well-developed tuberculous peritonitis, and we can easily distinguish between the bacilli in the veins and those in the peritoneum, those in the peritoneum growing and thriving, while the others succumb to their fate in the lung. These conditions of organic soil ought to be considered to a great extent, as acquired, and we ought to consider them in connection with the hygienic conditions in the midst of which the organisms live. The condition of nutrition ought to have first importance and our researches explain the reason perfectly.

Among the conditions of nutrition which create and augment the defensive powers, I will cite the use of alcohol. But, take care, I warn you, I speak of the moderate use of this substance, and not of its abuse which creates on the contrary a diminution of resistance in the body. For I have observed that the very healthy subjects which show the richest defensive material in the blood, without having the clinical signs of chronic alcoholism, have, however, been accustomed rather largely to alcoholic drinks.

From the combined results of our experimental researches, we have been able to get an exact idea of the manner in which the animal organism struggles, or can struggle against tuberculosis, and the weapons with which nature has furnished it to triumph over its enemies. We ought, therefore, to recognize the fact that the best means of fighting against the propagation of tuberculosis is to increase as much as possible the natural defensive forces of the body. Toward this end we have directed all our efforts, all our work and our whole energy. But, gentlemen, we must state that it is not the sanitarium alone that will succeed in diminishing the number of victims of tuberculosis, and protect humanity from its scourge. The sanitarium will not stamp this evil off the earth.

True, I do not doubt that sanitaria constitute

a very highly humane source of help to the tuberculous poor, and lend their aid to cure when that is possible, but sanitaria can play no decisive and important rôle in the social prophylaxis of the disease, and they seem to me, looked at from this point of view, more like sanitary cordons and quarantine stations, rather than means of preventing the spread of epidemics.

To create good hygienic environment in the country, and to suppress at the same time all soil suitable to the growth of these germs of disease, according to experience and to science this is the most efficient way to stem the tide of infection. When in a future that is more or less near, our efforts will have succeeded in strengthening the organic soil, and in furnishing it with specific energies that will serve to immunize it against infection, tuberculosis will be vanquished.

II.

Can we hope to see the dawn of this day. I have turned my attention and my studies especially toward this point and will tell you what work has been accomplished if you will have the kindness to follow me a little longer.

The first problem to solve was naturally the immunization of an animal against tuberculous infection, so that autoimmunization in him might be accomplished. This difficulty has been overcome in part. In 1895, in my reference at the Congress of Internal Medicine at Bordeaux, on the serum therapy of tuberculosis, I distinctly announced on the twelfth of August that the animals that furnished me the antituberculous serum, were immune. I did not insist on this, although I expressed myself very explicitly. For chronological reasons, however, it will be as well to revert to it. I declared in this connection that I had rendered immune dogs, asses and horses, and apropos of dogs, I said exactly the following words, which may be found on page 1080 of the official report of the Congress at Bordeaux. *"Progressive vaccinations, according to the methods that I have followed, immunize dogs against the injection of very virile human tuberculosis in their veins."*

These words were spoken by me, as I now recall it, on August 12, 1895. I have continued my experiments in this line, and to-day I can tell you that my animals are still immune. In my Institute are cows, asses, sheep and dogs that are completely immune, some for as long as five years; and I have even succeeded in immunizing rabbits.

I have rabbits which we have inoculated with no effect, with active virulent cultures of human tuberculosis, that killed the controls in from twenty to thirty days.

The possibility of immunizing animals, announced first by me in 1895, was announced anew toward the end of 1902, and in the month of March, 1903, by Behring at Vienna. I was delighted that so eminent an observer had confirmed in the calf what I had affirmed eight years previous, viz., the possibility of vaccinating and im-

munizing animals against tuberculosis, but I hold, as is very natural, that the fact should be recognized that I attained the same results several years before he did.

The vaccination and this immunization may be obtained in different ways and with materials of different kinds. We have succeeded in using materials taken from very active cultures, from dead and dried bacilli, from living and very virulent bacilli, and from an extract of active living bacilli. This extract manufactured by a cold method, without the use of heat or chemical substances is the one by which we have been able to obtain the largest amount of immunizing energy, without running any risk of creating tuberculous infection in the inoculated animal. By means of this process immunization takes place very quickly, and to use it, it is only necessary to resort to intravenous injections.

But setting aside for the time being the method of using it, it is sufficient to say that one can immunize an animal against tuberculosis, and render it impervious to the disease, even so that one can permit a larger quantity of bacilli than one would think possible to enter the tissues and to circulate in the human blood, following the usual conditions in which infection is produced.

In view of these facts it is natural to ask a question that implies another hope. Is it possible to cause by any feasible method such immunization in man?

I have studied the problem from two different points of view, and I have approached from two different avenues. There is the point of view of passive immunization, and that of active immunization.

One may, as is known, bring about passive immunization against infection in an animal, by introducing into its body defensive materials produced in the body of another animal that is immune to this infection. For this the serum of an immune animal is used. As this method was employed for cowpox, tetanus, diphtheria, and other infections, we have tested its value for tuberculosis. We have submitted our animals to injections of serum from immune animals, and have developed considerable antitoxic power in their blood, at the same time we uphold the evident action of new serum, on the vitality of the bacilli, and the resistance of the animals to the intravenous injections of virulent bacilli.

Tubercle bacilli introduced beneath the skin of those animals immunized by the serum were destroyed with singular rapidity.

We have made the same experiments with injections in a healthy man. Naturally it is not possible for us to verify their efficacy by means of the virulent bacilli test, as in animals. For this reason we have resorted to different criteria, that is to say to investigations upon the antitoxic action, and the agglutinating power. We have found that our treatment was followed by a considerable increase of agglutinating power (some samples showing as high as 1 to 30 or 1 to 50) as well as of antitoxic power; otherwise

the blood of these individuals affected the vitality of the bacilli.

We have also proof that injections of serum of immune animals into a healthy man cause the appearance in his body of specific elements of defense, of high degree, which furnishes us a very plausible reason for thinking that we have by these means, furnished our subject with defensive and immunizing materials.

We have had some direct proof with individuals suffering from pulmonary tuberculosis. A tuberculous patient is really comparable to an animal inoculated with tuberculosis, as the one as well as the other has bacilli in its body; in the one infection is caused by ambient conditions, in the other by the experimenter. We have injected the serum of immune animals into a man that was undoubtedly tuberculous, and at the same time that we caused the arrest of the tuberculous processes we developed in him defensive materials which we could measure exactly according to my method.

In the subjects that I have cured in a lasting manner the serum has evidently played the rôle of immunization along with its therapeutic action, for if not we would soon have seen a re-infection established in an organic soil that had lost its defensive powers, or the capacity to produce them. This is a fact toward which we have not yet directed our attention, but which, however, deserves to be seriously taken into consideration. For, owing to the great diffusion of the bacilli of tuberculosis, it must be admitted that when a subject cured of tuberculosis does not take necessary precautions, the possibility of his not contracting a new infection can only depend upon a modification of the organic soil which had become refractory to tuberculosis. Otherwise re-infection would be inevitable. We know several such individuals, treated with serum injections, who have been cured of tuberculosis for ten years, and who come from time to time to be under the control of our clinic.

The number of patients treated with the serum of immune animals and those of physicians who have in some degree applied this treatment to their clients, and continue to use it, is already so large that it is impossible to give complete statistics. But all the physicians who have inoculated tuberculous patients with the serum of immune animals have some cases that have been immune for several years. We, therefore, feel that we are right in admitting that injections of the serum of immune animals can develop in man a certain degree of immunity.

As a striking instance of this I will quote the case of a tuberculous family under my observation in the Polyclinic.

In the family, the mother who is a healthy woman, had a brother and two sisters who died of tuberculosis. The relatives of the father were healthy. Twelve children were born of this union, of which one died at the age of three, of diphtheria. All the other eleven were tuberculous, four dying before the family came to my

clinic. The remaining seven children who showed different degrees of pulmonary tuberculosis were treated by means of progressive antitoxin injections; that is to say they were possibly rendered immune. To-day they are in excellent health and have no symptoms of any trouble in the respiratory tracts. Their immunity has lasted for ten years, during which time they have been obliged to work under miserable hygienic conditions, and to be exposed to the weather. Their case is significant on account of the number of sick ones in the family to which they belonged.

Another method of passive immunization consists in introducing the defensive materials contained in the serum directly into the digestive tract, instead of injecting them directly into the body.

This method has not yet received the approval of all investigators, who hold that the defensive materials are altered and not assimilated in the gastro-intestinal tract. Setting aside all the doctrinal wisdom invoked to uphold this view, it is a fact that for certain infections the introduction of defensive materials into the stomach is possible. Sclavo, an investigator and experimenter of high renown, has proved this for diphtheritic antitoxins, and Mercatelli for the pest vaccine.

In my Institution and clinic, we have carried on such researches for five years, and have announced in preliminary reports what we can now affirm, viz., that we have verified in man as well as animals, what Sclavo observed for diphtheria. The immunizing materials pass into the circulation and have an analogous action to that of the serum injections.

We have in our Institute some rabbits that were fed on certain quantities of blood taken from immune animals and that after a month showed to a high degree both antitoxin and agglutinating power.

Behring recently expressed his hope, in Vienna, that it might be possible to immunize animals by feeding them with the milk of cows immune to tuberculosis, and announced that he was going to make investigations to see whether the anti-tuberculous material passed into the milk and could be assimilated by those who drank it. We have studied this question before him. We can state on the one hand that the defensive materials of the cow that is immune to tuberculosis do pass into the milk, but in small quantities only, but on the other hand that these materials, as I have just said, when introduced into the digestive tract are absorbed and exert a protective action in the organism of animals, and even of adult men. Also, it is quite possible that these immunizing materials get into the human body by means of milk.

But my spirit is burdened with the desire to attain even a higher end, viz., the artificial creation of active immunization in man, his vaccination against tuberculosis, just as it is practised for smallpox, in such a way that it will cause auto-

immunization. For active immunizations are preferable to passive ones, as they cause the organism to play a much greater part in the process of immunization; and its reaction to the contact of morbid elements created by the defensive materials is more stable and lasting in the human organism.

I have examined the question from the clinical standpoint, and I have studied it experimentally. From the clinical standpoint I will call your attention to an important fact that deserves serious examination. When a man develops in any part of his body whatsoever a localized focus of tuberculosis, if this focus heals the man remains, as a rule, immune to tuberculosis. It is rare, for example to see any other tuberculous focus appear; after a surgical operation for tuberculosis is performed. In families in which tuberculosis is prevalent we see subjects that have been cured of tuberculous arthropathies living in a very good state of health. Those who listen to me will be convinced of this if they but call to mind cases in their own clientele. They will find it the same for those who have suffered from cutaneous tuberculosis. These cases of external tuberculosis are very valuable for our demonstration, for they lend themselves to exact diagnosis and to exact establishment of complete cure, for, of course, cure must be complete if the case is to be of real value.

But one may also observe similar cases in visceral tuberculosis. There are many patients who have had attacks of peritoneal tuberculosis and who once cured have never had another focus of tuberculosis. The same observation holds good for tuberculosis of the pleura and lungs.

When a person is surely and completely cured of a pulmonary tuberculous focus, with the formation of a sclerotic tract in the area of a previous infection, he generally remains thereafter permanently unsusceptible to tuberculosis.

Similar facts which we obtain from the clinical histories show us that tuberculous subjects may after complete cure, remain immune against tuberculosis. I say immune, for as I have said before, as I like often to repeat, an organic soil that has once contracted tuberculosis, must necessarily be exposed to new infection if it does not undergo a (complete) transformation.

This clinical consensus and the positive fact that I demonstrated eight years ago, and have confirmed by successive work, viz., the possibility of definitely and surely immunizing animals against tuberculosis, have formed the starting point of my studies on the vaccination of men.

I have first outlined in my method all processes of immunization founded on the inoculation of any kind whatever, of living bacilli in the organism. Injections of cultures in the veins, however attenuated—such as employed by Behring for calves could never be used for man. And it is false that active immunization is only possible by means of injections of living cultures. According to this maxim that Behring has recently pronounced we would be forced from the start

to preclude all possibility of obtaining auto-immunization in man.

But, happily, I believe that it will be possible to obtain this result by means of inoffensive treatment. The first proofs of active immunization in man were furnished to me by the injections of tuberculous poisons.

I have already spoken to you of these experiments. In a healthy man these injections cause the formation of antitoxins, and of agglutinating materials, and correspond exactly to the effect that Koch noted recently, in connection with the immunizing action of injections of tuberculin in man. As long ago as 1891, apropos of the old tuberculin, I maintained that its action might, perhaps, bear some relation to the production of defensive materials in the blood; and my successive experiments, as well as those of a great many observers, have proved the truth of this assertion.

In some tuberculous patients, after having effected a cure by means of the serum of immune animals, I have practised successively injections of tuberculin and serum, then only tuberculin, and have obtained confirmatory results. For subjects treated in this way do not show, at the end of seven years any sign of tuberculosis, and continue to keep well, although living always in their habitual ways. Among others is a physician who continues to follow his profession, which exposes him continually to new infection.

I have wished, however, to produce immunization in another way, and I am applying myself to the solution of the following problem: How to obtain immunization by producing a circumscribed focus of tuberculosis on the surface of the body.

The principal difficulty consists in choosing a suitable material for immunization, for the point is to obtain everything that pertains to living bacteria without using the living bacteria themselves; we must, in short, find a material of inoculation with which there would be not even the most remote possible danger of causing tuberculous infection.

After many trials and experiments I have succeeded at last in preparing a material, which, all danger of infection excluded—will cause, when inoculated under the skin, a tuberculous phlegmon. By means of these inoculations, we possess the possibility of establishing the production of immunizing resources in animals. For, naturally, it is on animals that we have made our first experiments of immunization according to the new method.

I can state to you now, that the inoculations have determined the production of antitoxic, bacteriolytic and agglutinating materials, and have immunized my animals to the point of rendering them insensible to intravenous injections of virulent cultures that inevitably killed the controls, as I was able to prove even for rabbits.

Being convinced, gentlemen, that the treatment is innocuous, I have begun to use it on men. It is clear that in their cases, we cannot practise

crucial experiments as we do for animals, that is to say, the injection into the veins of virulent cultures of bacilli in order to get incontestable proof of their immunity. But the blood of subjects thus treated, has acquired a high degree of agglutinating power, and at the same time an abundant leucocytosis has resulted; that is to say, the blood of man has shown the same modifications as that of animals.

I have made these inoculations on one of the limbs, settling at last definitely upon the arm. At the point of injection there appears a development of a small circumscribed area of tuberculous ulcer with suppuration that is entirely sterile; the temperature runs a fever course for two or three days as a rule; and then everything is over.

This, gentlemen, is what I have done along this line.

Certainly the road along which we must travel is still long; but after all that I have seen with my own eyes, I have the right to be convinced that if we can render animals immune, we can in the future render man immune. I wish that there might still remain for me enough of life to see this conquest of science brought to an end; but the way is open, and by me or by others, the end will be obtained.

A vision of this day is clearly pictured in my thoughts, and it will be remembered in future that it was to the friendly hospitality of Spain, in her beautiful capital, Madrid, that the dawn was announced.

TUBERCULOSIS IN THE TENEMENTS; A NEW USE FOR FIRE-ESCAPES.

BY ALFRED MEYER, M.D.,

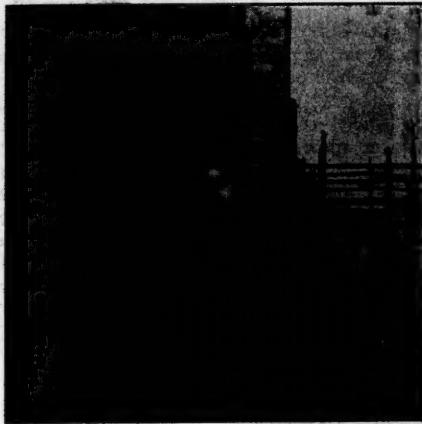
OF NEW YORK;
ATTENDING PHYSICIAN MOUNT SINAI HOSPITAL.

THE outrageous insinuations made by Lady Mary Wortley Montague against the medical profession in 1717 surely would be impossible to-day. She wrote at that time regarding a useful remedy for a prevailing epidemic: "I should not fail to write to some of the doctors very particularly about it, if I knew any of them that I thought had virtue enough to destroy such a considerable branch of their revenue for the good of mankind. But that distemper is too beneficial to them not to expose to all their resentment the hardy wight that should undertake to put an end to it."

Everybody who is familiar with the world's antituberculosis work of the past few years knows how large has been the share of physicians in the attempt to limit the spread of the disease, and, if possible, to wipe it out from the category of human ailments. It is due to the initiative of medical men that in nearly every civilized land of the world, sanatoria have been established in increasing numbers for the cure and sanitary education of those suffering from pulmonary tuberculosis; the propaganda for state and municipal aid has been kept up by them, they have served on committees for kings and governors without compen-

sation, to further the good work; and they have pointed with pride to the gradual but steady reduction in the death-rate from this disease.

In New York City there was a reduction of 10 per cent. last year in spite of the increase of population. It would be hard to find a more splendid



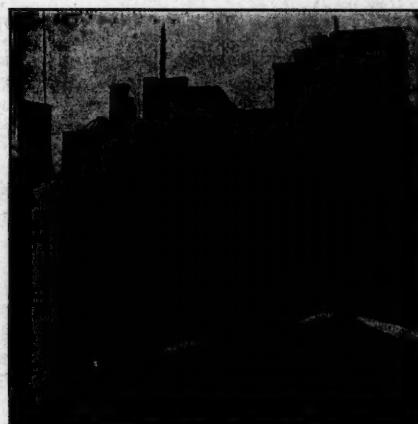
Pulmonary Tuberculosis Successfully Treated on the Fire-Escape of a New York Tenement House. Near View.

example of altruistic effort, and the sneers of Lady Montague would be strikingly out of place to-day. Yet the vastness of the numbers to be provided for in sanatoria has always been a great obstacle in the work; and another difficulty has been the overestimation of the value of particular climates and altitudes, and the underestimation of fresh air *per se*; the overestimation of the value of medicines and the underestimation of the value of light, food, invigorating baths, spongings and continual medical supervision. In recent years, however, the eyes of the medical profession have been gradually opened to the truth that a large proportion of cures may be effected without expatriation, without exhausting journeys, without great traveling expense, without breaking up of families, without a complete isolation from those who are dear, without the brooding home-sickness that comes with the rupture of domestic ties and banishment to distant lands and strangers. And the corollary of this position is the one that finally each country can solve its own tuberculosis problem at home,—this being true even of the smaller political units, such as counties and cities.

Now, in New York city we have a feature in tenement-house construction which appears to me to open up very large possibilities for the successful outdoor treatment of pulmonary tuberculosis among the poor—particularly in such cases as are forbidden exercise on account of fever. This feature is the fire-escape. Fire-escapes are almost universal in tenement and apartment houses, they are very accessible for the weakest patient, they are large enough to permit the

placing of a reclining chair or couch, they are convenient for such supervision and attendance on the part of the family as may be required by the patient, and many of them have abundant air and light, varying of course, with the style of tenement, the floor and the direction in which it faces. On the other hand, the fire-escapes are not open to the objection raised (among others) against the roofs, of smoke and gas from the chimneys; they are sheltered in many directions from the wind, or are easily sheltered from wind, rain, and snow by such simple contrivances as umbrellas, screens, or bits of awning.

At the recent meeting of the New York State Conference of Charities and Correction, I advocated the more general use by the medical profession of the fire-escape in the treatment of such cases of pulmonary tuberculosis as could not be accommodated at sanatoria, or for one reason or another did not wish to go to them, or pending their admission to them. Pictures were shown of a consumptive girl of fourteen years taking the outdoor-rest-cure-treatment on the fire-escape of the third floor of a tenement house in the neighborhood of First Avenue and Eighth Street, New York. The photograph was taken on Dec. 21, 1901, the temperature of the air at the time being 24° above zero. Although it was the shortest day of the year the little patient was able to spend about four and a half hours on the escape that day. She first came under my observation early in November, 1901, with extensive tuberculous disease of the left lung of about four months duration—high fever, rapid pulse (140), albuminuria (5 per



Pulmonary Tuberculosis Successfully Treated on the Fire-Escape of a New York Tenement House. Distant View.

cent.), diazo reaction and indications generally of a rapidly fatal issue. The fire-escape treatment was faithfully adhered to all winter, the number of hours spent there increased as the days lengthened, and the neighbors gradually became accustomed to the strange sight of the sick girl lying outdoors in the cold, all bundled up, with only

eyes, nose and mouth showing. The result has been extremely gratifying. The return of appetite and strength, the gain in weight, the gradual reduction and disappearance of fever and cough, the disappearance of complications, all betoken the value of the régime followed under surroundings usually condemned as portending failure. Nor is this an isolated case, but it is illustrative of others seen by me since then in which a similar régime was followed by similar results. This method of treatment is open to large numbers of physicians and patients in the city. It requires perseverance on the part of both physician and patient and the intelligent cooperation of both; above all, it requires a complete emancipation of the tenement-house population from the old idea that pulmonary tuberculosis is a catarrhal disease that compels the patient to avoid cold and exposure, and on the other hand, it requires the education of this same class in the modern view of infection and the advantages to be obtained, even at home, from a very free exposure to air.

There is one difficulty in the way of the general adoption of the fire-escape plan of treatment, but perhaps, after all, this is no real difficulty. I refer to Section 113 of the Building Code of the City of New York, forbidding the placing of "any incumbrance of any kind whatsoever before or upon any fire-escape, balcony or ladder" and providing a penalty for any violation of the same. Every New Yorker knows that this ordinance is more honored in the breach than in the observance. I believe the Fire Department expects the Building Department to enforce its provisions, and the Building Department in turn expects such action from the Police Department.* Public opinion will, I venture to predict, sustain none of them if the ordinance is enforced against those who in their fight for life are making of the fire-escape a real life-saving contrivance.

801 Madison Avenue.

SOCIETIES FOR THE PREVENTION OF THE SPREAD OF TUBERCULOSIS. THE NECESSITY OF SUCH ORGANIZATIONS AND THE WORK TO BE ACCOMPLISHED BY THEM.†

BY F. M. POTTENGER, PH.M., M.D.,

OF LOS ANGELES, CAL.

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WITH this meeting we begin the organized effort to prevent the spread of tuberculosis in Southern California. That there is need for such a movement no one can deny. Whether or not the society shall accomplish its purpose will depend very much upon the interest and earnestness manifested by the board of directors, since by the provisions of the by-laws of the society its man-

* Since writing the above I have learned that the enforcement of the law, so far as it relates to tenements, is lodged with the Tenement House Department.

† Read before the first meeting of the Board of Directors of the Southern California Anti-Tuberculosis League, Jan. 15, 1903.

agement is largely entrusted to our care; so let the interest manifested be commensurate with the importance of the work to be accomplished.

The tuberculosis problem is one that should interest every one. From time immemorial this disease has been the curse of mankind. In various countries it is accountable for from one-tenth to one-fourth of the total death-rate. Few are the families that have not felt its blighting touch and scarcely can one be found who has not a friend or dear one afflicted with this disease.

Such has been the condition of affairs throughout the ages; yet little has been done to prevent the disease until recent years. England began the movement sixty years ago by passing acts providing for sanitary homes and workshops, believing that there was a relationship between cases of tuberculosis and the bad hygienic condition found in the usual home and shop of the worker. In consequence of this wholesome legislation, the number of cases of the disease decreased. It was not, however, until Koch had discovered the bacillary cause of the disease and proven that it was a disease communicated from one person to another that it was widely believed that it could be prevented.

Few diseases of bacillary origin offer greater hope of an ultimate eradication than tuberculosis. The very nature of the disease favors this. While it is communicated directly from man to man, yet, if ordinary precautions are taken, infection rarely occurs. This is the evidence which inspires us with hope and shows us that tuberculosis is a preventable disease. Another important factor is the slowness with which the disease develops, months and often years intervening between the inoculation and the death of the patient; in fact, far more people become infected, and recover from the disease than die of it. Autopsies show healed foci in the lungs of from one-third to more than one-half of bodies examined. The great majority of these are cured without knowing that they were ever tuberculous. Of those cases in which the disease is diagnosed, at least 50 per cent. in the first stage can be cured by appropriate treatment; and a smaller number in the advanced stages. This gives us our second hope in fighting tuberculosis. It would be very hard to carry on a fight when it were known to be on the losing side; but, in our fight with tuberculosis, we have much to encourage us for we are dealing with a disease which is both preventable and curable.

Such being the case, why is it not prevented and why is it not often cured? Why is a preventable and curable disease allowed to destroy more than a hundred thousand lives in the United States yearly? This can only be accounted for by ignorance of the facts on the part of the many and apathy on the part of those who know.

Experimental evidence and clinical experience tell us that there are two elements in infection; first, the bacillus, and second, a susceptible individual. Unless both of these elements be present, infection is not likely to occur. We further know that the bacillus comes in every instance

from some previous case of tuberculosis, and that susceptibility is due to those things which lower vitality such as living in badly ventilated and poorly lighted houses; overcrowding; living on insufficient and improper food; various diseases; and the abuse of alcoholic liquors. Any comprehensive scheme of prevention should take into consideration all of these elements.

It is gratifying to know that wherever preventive measures have been undertaken, whether they have been directed to the destruction of sputum and other bacillus-bearing discharges, to the prevention of sale and consumption of infected food, or to the elevation of the plane of living of the people, they have been rewarded by a decrease in the death-rate from tuberculosis. A glance at statistics is most instructive to us who are about to take up this work. The following table gives the prevalence of this disease in several of the large cities of Europe, as based upon the number of deaths per 10,000 living inhabitants:

Moscow	45.68 per 10,000 inhabitants.
St. Petersburg	44.10 per 10,000 inhabitants.
Vienna	42.72 per 10,000 inhabitants.
Paris	38.70 per 10,000 inhabitants.
Berlin	23.06 per 10,000 inhabitants.
Rome	18.85 per 10,000 inhabitants.
London	17.68 per 10,000 inhabitants.

In Russia very little has been done; in Vienna, but little more, while in Berlin and London active measures have been taken to lessen the spread of the disease, especially in the way of better houses for the poor and better living for them; and in Berlin especially, precautions are taken to prevent infection through milk and meat.

A review of what is being done in other parts of the world will perhaps not be out of place here; so I will try to tell you what other nations are doing as best I can from the data which I have at hand.

As mentioned above, England is really the pioneer in this movement. In 1836 she passed an act providing for the construction of hygienic houses. This act has been followed by nearly a dozen more, all directed to the establishment of better workshops and better houses for the workers. Not only was England the first to recognize the necessity of better hygiene in the homes, but she was also the first nation to establish hospitals for those suffering from tuberculous diseases. The oldest of these is the Royal Seabathing Infirmary for Scrofula in Kent County, founded in 1791. Following this was the Royal Hospital for Diseases of the Chest, in London, founded in 1814. The Brompton, the most important of the English hospitals, was founded in 1841.

It is strange to say that, while England was the first nation to establish hospitals for the care of the consumptive, she has been slow in taking up the cause of the early cases and establishing sanatoria where they may have the opportunity and care necessary to regain health. This, however, she is now doing. In 1899 the National Associa-

tion for the Prevention of Consumption and other forms of Tuberculosis was formed under the presidency of the Prince of Wales. The patronage of the Prince of Wales gave to this movement the sanction of the government; consequently, it has had a steady growth. Many subordinate branches have been established, pamphlets of instruction have been circulated; and the people have been enlightened on this important question.

In Germany, a congress was held in the year 1899 to consider tuberculosis, as a disease of the masses, and how to combat it. This congress popularized the subject of "sanatoria for the poor." Since then the number of sanatoria has been constantly growing, and now there are nearly one hundred institutions where the curable cases of tuberculosis may go to regain their health. One thing that has helped the work of construction of sanatoria in Germany is the insurance law which requires every laborer who is earning less than 800 marks a year to be insured against accident, old age and disease. The insurance companies have learned that it is to their advantage to have tuberculosis diagnosed in its incipiency and to provide sanatoria for those afflicted where they can be cured in a short time. The demand of these insurance companies has called out the best diagnostic ability of the German medical fraternity and they are now diagnosing a very large proportion of the cases of tuberculosis before bacilli appear in the sputum.

France has been slow to establish sanatoria for the tuberculous adult but she has set the world a good example of what can be done in the treatment of scrofulous children. Throughout the nation there are several of these institutions near the large cities and also several on the sea coast. In these, about 50 per cent. of the children are cured. In Paris there are about forty dispensaries for the treatment of children where several hundred thousand children, suffering principally from scrofula and rickets, are treated annually. France has also given us another important lesson in dealing with the tuberculosis problem by establishing dispensaries in the centers of population. In some of these many hundreds of afflicted are helped annually. Not only is medical aid furnished, but in some of them food and clothing are given and a nurse or attendant is delegated to go and see that the home life is healthful and sanitary. In this way not only the afflicted one is helped, but the entire family is instructed in hygienic living and also in the manner of preventing contagion. In the city of Lille, such a dispensary is in operation. In this city it is estimated that there are about 6,000 persons suffering from tuberculosis and from 1,000 to 1,200 dying annually, although there are only about 220,000 people in the city. The great good that such dispensaries can do in a city with so large a proportion of its population tuberculous must be evident to all.

Other European countries have also taken active measures to check the progress of tubercu-

losis, but these great nations represent the best that has been done.

In the United States we have been somewhat slow in taking up the movement. This is due to several things. In the first place, we have no National Tuberculosis Commission, to take up the matter and, secondly, we have no royalty to popularize the movement. Whatever is done here must be done through private initiative hence it is sure to be slow.

The first Society for the Prevention of Tuberculosis in the United States was formed in Pennsylvania in 1891. Since then, Maine, Ohio, Illinois and Missouri have formed State societies; the cities of Buffalo and Cleveland have local societies; New York has a Tuberculosis Committee, and California comes next in the list with The Southern California Anti-Tuberculosis League. We should be proud of the distinction of being so near the front in this great work.

This paper would not be complete without mentioning the Central International Bureau for the Prevention of Consumption. The Central Bureau is composed of members from all nations that will affiliate in the international crusade against tuberculosis. The headquarters of the committee is in Berlin; and, at stated intervals, there will be meetings held for the consideration of the progress of the movement and for the suggestion of better methods. Corresponding members throughout the world keep the committee posted as to what is being done in the various countries and the Central Bureau on the other hand keeps the various members in touch with the general progress. It is expected that the members of the International Bureau will keep themselves posted as to the best methods of combating tuberculosis and that they will be centers for the distribution of facts for their respective countries. In this way, it is hoped that the Anti-Tuberculosis Crusade will take an international aspect, instead of each nation and each State being isolated in its efforts. This organization was formed in the year 1902 and held its first meeting in October of the same year. It is to be hoped that the committee will receive a generous support and that its work will greatly aid in the prevention of tuberculosis.

The problems before the Anti-Tuberculosis League of Southern California are the same as those of any other society which is trying to prevent tuberculosis. The disease is the same wherever found, produced by the same causes and prevented by the same measures.

Here in Southern California, however, we have the problem intensified; for we have not only the cases which develop here but also those which come from without our State, that they may secure the blessings of our climate. To offset this more intense problem, we have an eternal sunshine and aseptic air which renders the dangers from contagion much less than would be the case in a less favorable climate.

Koch is authority for the statement that sunlight will kill tubercle bacilli in from a few min-

utes to a few hours and Solly says that a room which has been occupied by a tuberculous patient or which has been infected by bacillary sputum may be safely occupied at the end of three to five weeks, if air which has been sunned has been admitted to it. So we see that Nature has been very kind to us in giving us this eternal sunshine and that she has protected us in a manner that is not common to many sections of the world. These facts show us that we may help to prevent infection by making use of sunshine and fresh air in our homes.

Cornet, and later, Coates, under the direction of Delépine, made experiments to determine the infectiousness of rooms which had been occupied by tuberculous patients. The results proved that where the rooms were well lighted and well ventilated the danger was much less than in those poorly lighted and badly ventilated, even though the cubic space per inhabitant were greater in the latter; also, that the dust in houses occupied by tuberculous individuals, who are careless about the disposal of their sputum, is dangerous, while the dust from houses of the same degree of cleanliness not occupied by tuberculous individuals is not infectious.

These experiments taken in connection with those made from the dust collected from the rooms of sanatoria when sanitary precautions are taken and which proved innocuous in nearly every instance; and, also, when considered in connection with the fact that during the past 20 years since the discovery of the bacillus many thousand patients have been treated in institutions and yet neither a nurse nor attendant has been infected in those whose history I have at hand, shows that carelessness is the prime cause of the spread of infection and also that where care is taken there is practically no danger.

According to the public health reports for the year ending December 31, 1900, there were in 18 cities and towns in the State of California, having an estimated population of 675,000, 2,000 deaths from tuberculosis. That is, 17.6 per cent. of the deaths were assigned to tuberculosis, making a death-rate from tuberculosis of 2.9 per thousand of inhabitants. Eight of these cities and towns were in Southern California representing an estimated population of 147,479. In these, tuberculosis caused 23 per cent. of the deaths, making a death-rate from tuberculosis of 3.5 per thousand of inhabitants. When we consider the thousands of tuberculous individuals who come to Southern California annually and especially the number who come to die, and that these statistics include only the centers of population where the death-rate is the greatest, we must congratulate ourselves that our rate per thousand inhabitants is not higher. That it is not is not due to any special precautions that are taken, but must be attributed to the favorableness of our climate. Here people can be in the sunshine three hundred days in the year and even if they are not fresh air fiends, they can have their houses open to the free entrance of air most of the days. This death-

rate, however, is far too high. By proper precautions we can reduce it. We can save the lives of many who come from without our State, and by proper regulations reduce the number of native cases, and in this way lower the rate. How to do this is one of the problems before us.

The work of our league should be carried out along several lines. In the first place we should educate the people to the fact that tuberculosis is communicable. We should teach them just where the danger lies and that if the bacillus-bearing discharges, of which the sputum is the chief, and in most cases perhaps the only one, are carefully destroyed. There is no danger from the tuberculous individual. While we must insist on the enforcement of sanitary laws, we must avoid creating in the minds of the people an unnecessary fear which will work undue hardships on those afflicted. Nowhere can it be said with greater justice that "a little learning maketh mad," for, those who have learned that tuberculosis is a communicable disease and have learned nothing more have become frightened and are associating, in their minds, tuberculosis with such diseases as smallpox. We must emphasize with equal if not greater care that tuberculosis is preventable. We must furthermore teach them how to prevent it, give full and explicit directions for the afflicted and also for those who must care for them. The necessity of sunlight and fresh air should be emphasized.

Sanitary laws relative to the prevention of infection, such as those forbidding expectoration in public places, providing for the notification of tuberculous cases and the disinfection of rooms occupied by tuberculous individuals before being reoccupied should be passed. In order to facilitate and encourage early diagnosis in the cases among the poor, free examinations of sputum should be made for those who are too poor to pay for same. Laws regulating the height of buildings, the height of ceilings, the ventilation of workshops and tenement houses, prohibiting the construction of unsanitary dwellings and overcrowding, would do much to prevent that lowered vitality which facilitates infection and would offer less opportunity for the bacilli to thrive.

Lest I be misunderstood, I would like to offer a word on the subject of notification before passing. There is objection raised to this on the part or some, believing that it will work as a quarantine. Not so. It is only intended that the case be reported that the health officer may see that precautions are carried out. Perhaps, until public opinion is educated, it would be better to have notification optional. No one but the attending physician and the health officer need know that the individual is tuberculous. It should work in favor of the afflicted instead of against him.

Another important field of work for our league is in caring for the afflicted poor. This is a necessary measure from the standpoint of prevention and desirable from the standpoint of the humanitarian. As long as the poverty-stricken tuberculous individual is compelled to care for himself,

he will be forced to occupy unsanitary quarters and will scatter infection about him either because of ignorance or because of a spirit of apathy. Since each patient on an average infects one new one, and each careless one may infect several, it can be plainly seen that the care of the helpless poor bears a very important relation to the problem of prevention of tuberculosis; and, since hospital facilities are provided for those suffering from other diseases, it is but just that they should be provided for these.

The Anti-Tuberculosis League could perform for the tuberculous poor an act of mercy, render society a noble service and itself a great honor, if through its efforts there should be established in our midst a system of dispensaries in the cities where those afflicted could come for advice and where those who suspect the disease could be examined while they are in a curable stage; and further, if through its agency there should be provided sanatoria for those who are curable and hospitals for those in the advanced stage.

Such is the work that has been done by organizations of similar aim; such is the work that I hope will be accomplished by ours. We may have to work slowly, for we cannot go faster than public opinion; but, by the distribution of carefully written pamphlets, by the delivery of thoughtfully prepared lectures and by the judicious use of the public press, I believe it is possible to secure a hearty cooperation on the part of people.

THE SANATORIUM TREATMENT OF TUBERCULOSIS.*

BY HERBERT MAXON KING, M.D.,
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WHEN an appeal is made to the family physician for his counsel as to the best and most promising course to follow as a means of relief or cure in a case of tuberculosis, the question with which he is confronted is by no means so simple as at first appears. Circumstances—varied as individual cases—must be carefully taken into consideration, and will, in each instance to a great extent determine the choice of alternatives which offers. Of these, broadly speaking, there are three: (1) The patient may be kept at home and given the best which his means will permit in the way of care and treatment; (2) he may be sent to an open health resort, where it must be left largely to his own judgment and financial resources as to his personal environment and his medical supervision; and (3) he may be placed in an institution, especially adapted to the care of this class of sufferers.

The chief factors which will have to be considered in reaching a decision in any given case are of course two: (a) The extent to which the disease has advanced including the individual

* Read in abstract by invitation before the New York Academy of Medicine at a symposium on Tuberculosis, February 5, 1903.

resistance of the patient, and (b) the financial resources of the patient.

Within the limitations of the subject which has been assigned to me, a discussion of the many phases of the question both as to their relative merits in a given case and as to their more general aspects as applied to the class of tuberculosis invalids as a whole would be out of place. It is sufficient to say that with some experience and discrimination each case will, by its own characteristic peculiarities determine the class to which it belongs and the treatment which is best to be accorded. Confusion as to choice of alternatives cannot easily arise when once all the facts are known. The difficulty seems to be that too often advice is given without a sufficient inquiry into the facts, with the result that in every open health resort, many forlorn individuals without sufficient means or sufficient intelligence to secure the rest and medical supervision, which in certain stages of the disease are so imperatively essential, die each year who would have had a much better chance of arrest or cure of their disease in a properly conducted sanatorium. While, on the other hand, in every sanatorium may be found a certain proportion of cases which would be as well or better off in their own homes.

As an outcome of the very general agitation of the subject during the past few years, such mistakes are fortunately becoming more rare and the special functions and inestimable advantages of sanatorium treatment are for like reason much more generally recognized by both physicians and their patients. Brehmer began his memorable work in Gerbersdorf in 1859 and, as every one interested in the subject knows, after contending with more or less bitter opposition for several years, succeeded in demonstrating the value of the fundamental principles which governed his methods to the satisfaction of many of his most severe critics. The sanatorium at Falkenstein, to which Knopf refers as the "Mecca of phthisio-therapeutics," was established through the efforts of his ex-patient and pupil, Detweiler, in 1876. From these beginnings the growth of the sanatorium idea in Germany and Switzerland was constant, though for reasons which will follow presently, much more tardy than would otherwise have been the case with a medical innovation possessing the demonstrable advantages of the sanatorium.

In this country the acknowledged pioneer in Brehmer's methods is Dr. Trudeau, who established the Adirondack Cottage Sanitarium in 1884 and whose splendid labors in this field have gone far toward educating the medical profession in America to a recognition of the advantages of special institutional care of the phthisical patient.

When in 1882 Koch announced his isolation of the tubercle bacillus, attention was for the time almost completely diverted from the slow but rational open air therapeutics of the sanatorium to the golden hope of finding a "short cut" to health in a specific. And to this circumstance, I think, may be attributed the retarded development of

Brehmer's ideas. When it was finally understood, however, that curative or immunizing agents for tuberculosis were not to be attained, if at all, until, so to speak, a vast deal of new country had been explored, that antitoxic and bactericidal bodies were not to be available for clinical purposes except by the slow process of scientific evolution—attention of the clinician again turned to the methods which so far had alone given satisfactory results in the treatment of the consumptive. This subject then, notwithstanding the over abundance of literature which recent discussion has brought forth, can not yet fail to be of interest to the practitioner of medicine to whom the question as to how to advise his phthisical patient is constantly arising.

Before entering into the details of the so-called sanatorium treatment of tuberculosis, a few general observations relative to the subject must be first considered. It must be remembered that there can be no universal rules as applying to all cases alike, therefore in describing a routine practice either as pertaining to rules of admission, methods of treatment or to the administration of sanatoria themselves, it must be left to reasonable inference to modify and adapt them to the particular individual in each case. For instance as to the location of the institution, both in its relation to climatic advantages and public convenience. Experience bears out the truth of the saying that while no climate is specific for tuberculosis many climates are useful. Indeed, so long as the essentials of Brehmer's methods are secured, the location of the institution in which they are carried out may be safely left to expediency. The first of these essentials is unquestionably pure air, and plenty of it, and as it is obvious that this important desideratum cannot be secured within the immediate limits of a thickly populated city, the site for a sanatorium should be sought elsewhere. Nevertheless it must not be forgotten that excellent results are obtained in two sanatoria situated within a radius of three miles from the center of the city of Edinburgh, and I am informed that the "sanatorium wards" of Brompton Hospital yield amazingly good results, notwithstanding that the institution is within the limits of a thickly populated London suburb, and what is still more important that but a very small proportion of its patients are received in the earlier stages of the disease. L'Hopital Boucicaut, as you know, is within the fortifications of the city of Paris, yet in the pavilions set aside for phthisical patients there, it is remarkable what is done toward the arrest of the disease. It must be admitted, therefore, that sanatorium methods may, to a certain extent, be successfully carried out even in towns, while at the same time no one will deny that a location remote from centers of population is much to be preferred.

Wards and pavilions for the reception and sanatorium treatment of phthisical patients in connection with town hospitals have recently come to be recognized as a crying need, and while

such can not for apparent reasons be considered ideal institutions they are nevertheless the best expedients which the urgent necessities of the situation can suggest, and after all much can undoubtedly be accomplished in them.

Again climatic influence as a feature of sanatorium treatment should be here considered. The subject of climatology in relation to tuberculosis is, I am aware, not within the province of this paper and is elsewhere fully and ably discussed. It is, therefore, sufficient for present purposes to limit my remarks to the question as it relates to sanatorium treatment alone. That there is a certain percentage value in altitude in phthisis I am convinced, but just what that percentage is, has never so far as I know been satisfactorily worked out. It is probably not large and when applied to all cases as they occur in practice, *i.e.*, early and advanced stages alike, is entirely wiped out. Unquestionably sanatoria situated in the high altitudes, *e.g.*, from 5,000 to 15,000 feet are far more limited in their scope of usefulness than is the case with those at the more moderate elevations. I have heard it remarked, on the other hand, by one whose broad experience gives authority to the statement that no institution intended for the treatment of patients in the early stages of phthisis should be located at less than 1,000 feet above tidewater, and from my own experience, I am much inclined to agree with him.

The advantages to be derived from altitude may be summed up in (*a*), the rarefaction of the atmosphere and the consequently lessened barometric pressure, (*b*) the reduced humidity, (*c*) the acceptability of the respired air and (*d*) the diathermy. Now, in a method of treatment in which life in the open air plays such an important part these advantages demand thoughtful consideration.

The question of direct sunlight and wind is still an open one. Recent observations seem to show that diffused sunlight, such as obtains on cloudy days, has in tuberculosis all the therapeutic advantages of the direct sun's rays. For my own part, I believe that in this as in many other questions in phthisiotherapy, adherence to extreme views is a dangerous policy. Certainly a considerable amount of sunshine is desirable in sanatorium treatment, while at the same time it is remarkable that during the winter months in our climate when the number of cloudy days exceeds by far those of the summer months, sanatorium patients make their most rapid and substantial gains. The same is true in Davos, St. Moritz and Arosa. It is possible, however, that other causes enter in to produce this result.

In spite of contrary opinions on the part of many authorities I am in favor of wind in a resort for phthisical patients, protection of the individual from direct exposure is easily accomplished by shelters and the purifying and invigorating effects of strong, cool and dry wind in a pure air can not be overestimated. It secures ventilation of buildings and apartments much better than any artificial device can do and when

patients are constantly living in the open air, as in a sanatorium. I have not remarked that it ever increases liability to colds or aggravates catarrhal conditions of the respiratory mucous membrane, which I believe are the chief objections which have been brought against it.

In short the location for a sanatorium should be sought in a climate which need be neither very cold nor very warm—it should be sufficiently dry to prevent the depressing and enervating effects of excessive humidity, yet not so dry as to permit dust suspension in the air. It should be stimulating and possess atmospheric conditions which favor the development of nervous and muscular vigor and the altitude should whenever possible exceed 1,000 feet.

The two fundamental principles of sanatorium treatment as established by Brehmer, and which in their essentials have not as yet been improved upon, are hyperaeration and increased nutrition. The first is attained by constant life in the open air, and the second by systematic feeding to the limit of the patient's capacity for assimilation.

Brehmer himself was an advocate of exercise in the open, while Detweiler introduced and has practised rest in a reclining position in connection with the "cure" at Falkenstein. At present the consensus of opinion is vastly in favor of the latter plan as effecting the best results, yet in this as in so many other medical doctrines extreme views are fraught with danger. One cannot resist the temptation to protest against a long continuance of a life of supine inactivity after the more urgent symptoms of the disease have subsided and the ravages of tissue waste have been compensated as shown by a return to, or nearly to, normal weight and temperature. That weight can be rapidly and enormously increased by a persistent adherence to a life of absolute rest and stuffing is certainly to be admitted but it has been demonstrated only too often that this increase above normal either in amount or rapidity is at the expense of the general well-being of the patient and is soon lost on return to the ordinary mode of living. It is well in this to be guided somewhat by analogy, and the fact is well known that stall-fatted cattle are far more prone to tuberculosis than are the grazing herds of under-weight kine on the prairie.

On this point the recent work of Bardswell, Goodbody and Chapman, in the Brompton Hospital, is interesting and instructive, the conclusions which they reached are of sufficient importance to quote in full:

1. "That since very large diets gave worse results than those of more moderate amount, the indiscriminate stuffing of all tuberculosis patients should be replaced by systematic dieting. The diets as regards amounts and constitution should be determined in each case after due consideration has been given to the respective conditions as regards: (*a*) The activity and extent of disease; (*b*) amount below weight; (*c*) digestive capability; and (*d*) to some extent, personal dietary likes and dislikes.

2. "That in view of the bad effect which overfeeding gave rise to in the normal individual, great care should be taken in the selection of a diet for patients who, as the result of treatment, have reached or passed their highest known weights. When this regain of weight is associated with arrested disease, the original diet found suitable for a person very considerably under weight and with active lesions, should be reconstructed more upon the lines of what would be suitable for the same person in perfect health.

"The observations were not sufficiently extended to allow of conclusions being drawn as to which diets gave the best results as regards the condition of the lungs; but subsequent sanatorium experience of two of us, with the advantage of being able to carefully observe the course of pulmonary lesions in patients upon weighed diets, leads us to think that the lungs do not improve any more rapidly upon forced feeding than upon generous diets. Further, there is no doubt that anorexia, dyspeptic symptoms and vomiting are much more frequently met with when working with very large diets than when more moderate amounts of food are given."¹

With regard to the kind and amount of exercise permissible and the class of patients to whom it is applicable I shall presently give the results of some interesting experiments and observations made at the Loomis Sanatorium Annex last fall. Of one thing we may be quite sure, that even in this matter of exercise and feeding there are no hard and fast rules which can be universally employed. In the sanatorium as in private practice, success in treatment in the highest sense is not to be attained by grouping and classifying patients and treating them accordingly. Each individual is a law unto himself and should demand attention and treatment on his own merits, irrespective of the class to which his condition might relegate him. In other words, the patient and not his disease is to be treated.

And this brings up the matter of medical supervision upon the efficiency of which depends the success or failure of the sanatorium. It is unfortunately true that in the past a certain amount of discredit has been cast upon these institutions through the occasional lapse from the proper ideals to those of the hotel proprietor. The commercial instincts of the inn-keeper are incompatible with the highest development of the sanatorium. The medical officer must have the helm and must never lose sight of the fact that he is, first of all, the physician; and that the relation which he bears to the management is that of the captain to the engine room. I believe that to the best interests of the sanatorium, it is essential that the medical officer should have had a more or less mature experience in private practice before undertaking institutional work. He has thus been taught to individualize his cases and to avoid the danger of treating them in groups and classes collectively.

In this connection I remember upon one occasion visiting a large military hospital for con-

sumptive soldiers. At a certain hour, with soldierly precision, the bugle summoned several hundred ambulant consumptives into line. The surgeon-in-charge, an excellent man but with military training hopelessly ingrained upon his methods, then proceeded down the line, his assistants and orderlies reading from charts synopses of the last twenty-four hour records from which data the procedures for the day were prescribed and the men dismissed to quarters. Thus without elasticity or the least attempt at individualization the greatest possibilities of the sanatorium were lost. It represented better perhaps than anything else could have done—*treatment by averages*—a sort of medical "dead reckoning."

The medical staff of a sanatorium should be much more than the special inducement of a health resort hotel and in the few instances above mentioned where adverse criticism has been merited, it has, I think, been attributable to failure to recognize this fact. For efficient service the work in the sanatorium should be appropriately divided so that for every multiple of 30 patients there should be an additional medical assistant. Some authorities, I am aware, allow of a considerably greater number, but it is best to err on the right side in such matters and wherever possible to avoid the danger of falling into the thraldom of routine.

Of course, the narrower the limitations which govern the admission of patients the larger the number which can, with good judgment, be accorded to the service of one physician. But when a proportion of advanced cases are admitted, if any attempt is to be made toward individual clinical investigation, the staff must not be curtailed.

The laboratory of such an institution should be equipped not only for the ordinary clinical work but for medical research as well. Every sanatorium should aim to contribute its due share to the general fund of scientific knowledge on a subject so important to the welfare of the race as is tuberculosis. With such opportunities as are here offered for laboratory and clinical research it is surprising how little in the way of original investigation has been done in sanatoria; from this general statement, however, it is gratifying to be able to point to the splendid exception of Dr. Trudeau's Saranac Lake laboratory, which in a way is an outgrowth of the Adirondack Cottage Sanitarium and which has always been and always will be a credit to its founders.

While I admit that it might be too much to expect from the average sanatorium that it should in this respect emulate the example of the Saranac Lake institution, I still contend that there is much valuable labor of investigation well within the scope of every properly equipped institutional laboratory, and which when accomplished will add inestimably to our practical knowledge of the treatment of tuberculosis. I would suggest, for instance, further study into the problems of metabolism, a more systematic study of the sera and the formed elements of the blood, investiga-

tion into the shadowy unknowns of mixed infections, further research in dietetics and so on ad infinitum.

The question of nursing arises in every sanatorium where any but the earliest stages of the disease are admitted. I know of no class of invalids the care of whom makes more heavy demands upon the tact and discretion of the nurse than does the moderately advanced consumptive patient. The institutional nurse, therefore, should be chosen first with regard to her training which should be like the physician's—a special one upon a good foundation of general practice—and of no less importance, with regard to personal adaptability and resourcefulness. A well-qualified nurse who meets the requirements will do more to make the atmosphere of the infirmary cheerful, hopeful and unobjectionable, than any other one agency which it is possible to introduce.

We have now to consider what classes of phthisical patients are suitable for sanatorium treatment; what results may be hoped for and what duration of residence may be taken as the average minimum for each class. For the purpose of present convenience, tubercular invalids may be grouped under three heads: (a) those whose condition is hopeless; (b) those whose condition permits of an expectancy of an improvement or an arrest; and (c) those whose condition justifies a hope of cure.

Each of these groups has a distinct and peculiar claim upon institutional care and treatment as embodying the best practical therapeutics which for the time being are within the reach of the consumptive. The first on the ground of the weal of the public health no less than on humanitarian considerations. The second on the ground that extension of life, even when that life must be circumscribed by narrow limitations, is a worthy object and may have a value entirely disproportionate to what appears and the third on grounds too obvious to require argument.

An institution devoted to the care of hopeless cases, however, can scarcely even with the broadest interpretation of the term, be considered a sanatorium and accordingly need not here be discussed, but with the other two groups the average sanatorium has to do.

Until quite recently the true incipient type of the disease was comparatively seldom recognized, and as a consequence the average patient admitted to even the most exclusive sanatoria was one who to-day would be classed as advanced, yet the results as shown by the numbers discharged as "apparently cured" and "arrested" were remarkably gratifying. Now we know full well that the healed tuberculous lesions found in the autopsy chamber in persons dying from other causes and which furnish us with such abundant evidence of nature's cure of the disease, are in the vast majority of cases, arrests in the early stages before softening has occurred. It therefore should require no argument to convince one that the earlier the case is placed under

sanatorium treatment, which means after all merely placing the patient in the best possible condition for nature to effect its cure, the more certain is arrest secured and the shorter will be the duration of residence. It is therefore in the early stage that we should endeavor to obtain the cases for sanatorium treatment, but on the other hand, theoretically true as it may be that with sufficient vigilance advanced cases except in a few overwhelming infections, shall cease to occur, we have to face the fact that they *do* occur. It is indeed frequently the case that the insidious inroads of the disease have already produced advanced lesions before the patient is aware that he is ill and as fervently as it might be wished that it were otherwise we are obliged to accept these cases for sanatorium treatment. It is interesting and encouraging, therefore, to know what can be accomplished in these more advanced cases.

In a report of the treatment of 1,000 consumptives, at a sanatorium in Russian Finland, Gabrilowitch gives the following statistics: 122 were in the first stage, 720 in the second stage and 158 in the third stage, 72 per cent., therefore, were in an advanced stage on admission. On discharge there were 253 *cured*, 472 improved, 187 classed as "without result" and 88 died; 72½ per cent. were therefore cured or improved and 25.3 per cent. cured alone.²

That advanced cases, therefore, are often arrested and apparently cured when placed under suitable conditions is undeniably true and the sanatorium unquestionably has a scope of usefulness beyond the limitations of the incipient tuberculous patient. In admitting patients to the Adirondack Cottage Sanitarium, which excludes all but the earliest cases, Dr. Trudeau pursues an excellent plan for determining the suitability of cases: First is ascertained duration of disease, and if the patient has or has not steadily declined since then; second, the present status of the patient is noted with particular reference to amount of fever, sweats, cough and expectoration; third, chief importance is attached to rational symptoms rather than to physical signs. Those favorable for admission are (a) pleuritic cases, (b) cases with fair nutrition and slight impairment of health, (c) cases beginning with hemoptysis without constitutional impairment, (d) incipient cases.

Those unfavorable for admission are (a) cases which have steadily declined since onset; (b) cases showing a preponderance of constitutional impairment over comparatively slight physical signs; (c) those presenting complications especially laryngeal, glandular, intestinal, bladder, renal or joint affections; (d) all septic cases showing type of periodic hectic fever.³

Thompson Campbell, like Trudeau, would exclude patients who, although presenting slight objective findings have pronounced (evident) prostration of strength from the onset. He lays special stress upon the pulse frequency as a prognostic sign and unconditionally excludes all cases with albuminuria and pronounced tuberculosis of the larynx.⁴

In a sanatorium with sufficient infirmary accommodations, cases which might otherwise be excluded, may be admitted on a short trial with the hope, which is often realized, that the unfavorable type of the disease may be changed.

There is, to be sure, a certain type of laryngeal tuberculosis marked by more or less extensive ulceration with surrounding induration and edema of the mucosa, involving the arytenoids and often the epiglottis and usually accompanied with severe and painful laryngeal symptoms which are invariably associated with rapidly fatal cases, and unquestionably such patients are not to be materially benefited by sanatorium or any other treatment, and should therefore be excluded. But to class all laryngeal cases together as rendering patients unfit for the sanatorium is, I think, too sweeping a plan and does injustice to many whose condition is susceptible to great improvement or cure. Every laryngologist is familiar with that form of tuberculous ulceration occurring in the larynx usually on or near the posterior extremities of the vocal bands or in the interarytenoid fold, which under favoring circumstances (rest and suitable treatment) undergoes fibroid change and results in healing. Now the place of all others for such patients, it seems to me, is in the sanatorium where the facilities are at hand for giving them that constant medical supervision and favorable environment which are most needful and almost unattainable under ordinary conditions.

With a judicious selection of cases, therefore, laryngeal tuberculosis per se need not necessarily exclude a patient. If the aim of the sanatorium is merely to turn out the highest percentages of "cures" and "arrested" cases, however, I will admit that it is the *safer* plan to exclude *all* laryngeal complications.

It is well here to remark in parenthesis that by "constant medical supervision" I do not mean that persistent topical meddling with the larynx, which the inexperienced laryngologist is unfortunately too apt to practise. It requires but a little attentive observation to demonstrate how beautifully nature takes care of these "by-products" of tuberculosis as soon as general nutrition and vigor are brought to approach the normal.

The minimum duration of residence in the sanatorium and the results to be expected in a given case are questions which can only be answered tentatively or not at all. But we can on the other hand employ averages to some advantage, taking as standards the excellent and trustworthy statistics of Dr. Trudeau and Dr. Turban. From these we may gather that the minimum term of residence for the incipient and uncomplicated case should not be less than three months, while for the moderately advanced case with favorable symptoms a six months' residence may be considered as the mean minimum which will effect a satisfactory arrest or apparent cure. If these figures were more generally kept in mind there would be fewer instances of patients coming to the sanatorium with the comforting but mislead-

ing assurance from their family physicians that a few weeks' residence would be all that was required. When the term "cure" is employed in this connection we must distinguish as do the Germans between a "pathologic cure" and, as they put it, an "economic cure" ("wirtschaftliche Heilung"). To achieve the former it is obvious a much longer time is required. It appears, however, that when the latter is accomplished patients may safely be permitted to return to their homes and occupations—provided, of course, that their homes are clean and their occupations wholesome where, imbued as they are, with sanatorium methods relapse is comparatively infrequent and the pathologic cure finally effected.

The average duration of residence in the instance of patients discharged from the Loomis Sanatorium as "apparently cured" and "arrested" for the year ending October 31, 1902, was six and a half months in the case of those whose lesions were classed, on entrance, as "early" and "moderately advanced" the longest term of residence was 23.5 months, the shortest two months.

In a word the duration of residence and the results obtained will depend almost wholly upon the patient's condition on admission and his willing cooperation during the treatment. This latter factor is one which, while seldom difficult to secure if a little tact is exercised and the patient is even fairly intelligent, is of so great importance that without it the patient had better be at once discharged, both for his own good and for that of other patients in the institution.

As a matter of fact this difficulty is one which is rarely to be encountered in the sanatorium. No one can make even a brief sojourn at any of the great institutions without being profoundly impressed with three remarkable phenomena. First, the general air of good cheer and hopefulness which prevails. Second, the strikingly healthful and even robust appearance of the patients, and third, their evident capacity for large amounts of food. For those who have never visited an institution of this nature, there is a surprise and an education in store, and yet I have heard it remarked and with no little emphasis by some physicians that they could not bring themselves to advise their patients to go to a sanatorium because of the atmosphere of invalidism which they imagined could not but prevail there. This however is an old, and I am happy to say, declining fallacy born of experience in open health resorts and not in the closed sanatorium.

One has not to go far to discover the explanation for this cheerful attitude of mind on the part of these patients. There is a sort of communal sympathy and general interest in the fight which all are making which is perhaps the first cause. Then the gregarious instinct of the race finds the pleasantest possible expression under the circumstances in the cottage or pavilion life of these people all bent upon one object, namely, the recovery of health. Instead of inducing depression this stimulates courage and it is apparently recognized by the patients themselves that in this com-

munity of interests there is a moral strength which could not be found elsewhere. Whatever the cause, however, the fact remains that whether at Gerbersdorf, Falkenstein or Nordrach; at Davos or Arosa; at Saranac Lake, Asheville, and Silver City or at Liberty, the cheerful and healthful mental attitude which one finds prevailing within the precincts of the closed sanatorium, is in striking contrast to that which is often observed in the open resort.

Before proceeding to the final and more specific discussion of my subject it is well to say just a word in defense of sanatorium treatment as opposed to the argument in favor of carrying out sanatorium methods in the home of the patient. It has been argued that inasmuch as Brehmer's methods could be introduced into home treatment as in many cases has already been successfully done, it was therefore unnecessary to remove the patient from his family and friends and thus impose upon him a gratuitous sacrifice, by residence in a sanatorium; that the discipline of the institution while no doubt necessary there, was a feature which could not but be irksome and otherwise objectionable to the average American, imbued as he is with a jealous love of his personal freedom. Now it is my experience, and, I think, that of nearly all, who work in sanatoria, that with the intelligent invalid "no vigilance is fastidious, no skilled control vexatious." In the vast majority of cases we not only have the willing cooperation of the patient but when once he is made to understand the value and necessity of a systematic course of living, one obtains his enthusiastic support and he becomes at once a missionary in the field.

In the course of his address before the section for the Discussion of Sanatorium Treatments at the British Congress, 1901, Prof. Albutt said: "The method was worked out in a sanatorium created for the purpose. It has been tested and perfected in sanatoriums, and if now it can be carried on outside of sanatoriums, which is not too readily to be admitted, this is so only by bringing the skill and conditions of the sanatorium into the home. I should look with little confidence on the home treatment of a phthisical patient by a physician unversed in the practice of a sanatorium, and by a patient who had not at least a month's training within its precincts. It is, as it were, to tell a boy at home to read his Caesar and his Xenophon, a little Euclid and algebra, to pat him on the head, bid him be good and industrious and promise to call in a week or ten days to see how he has got on."

It is unfortunately impossible to give every phthisical patient the benefit of residence in a sanatorium. We are, and for some time shall continue to be, for one reason or another, obliged to care for a considerable proportion of these cases at their own homes. But I still contend that wherever the choice is possible it should, in the majority of cases, be in favor of the sanatorium.

(To be Continued.)

TUBERCULOSIS OF THE MIDDLE EAR, WITH THE REPORT OF A CASE.*

BY Z. L. LEONARD, M.D.,
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As with other parts of the human body so the ear may be the seat of a manifestation of the tuberculous process. It may precede a general systemic infection which later develops in the lungs or in the parts remote from this location. Usually, however, it is secondary to an attack in other quarters which has progressed to an advanced stage. On account of its insidious, painless approach and because of the gravity of the disease elsewhere the trouble with the ear is overlooked, or if noticed, little attention is paid to it. It is more likely to excite the curiosity of the otologist and to be recognized by him as a sequence to his inquiring research.

As early as 1853 Wilde gave a description of the appearance of the drum-membrane and neighboring parts which antedated that of other writers on the subject. In 1865 Politzer more fully described the conditions by which tuberculosis of the ear might be recognized. This is all that was known with any degree of certainty, unless we except the writings of Buhl, who pointed out the fact that when pus was collected in an osseous cavity the walls facilitated absorption and tuberculosis supervened.

It was not until the discovery of the specific bacillus that a diagnosis could be made beyond the doubt of a denial of the existence of the disease in the ear. If it were not taken for granted that it was secondary to tubercular disease elsewhere it would be next to impossible to form a definite diagnosis from the appearance of the ear other than by excluding causes which lead to suppuration under ordinary circumstances. The discharge differs but slightly from that seen in a case of chronic purulent otitis media. It differs somewhat in this respect that it is less thick and more irritating as it flows over the healthy surface. But there are other signs which would draw the attention of the surgeon to the fact that he has to contend with a something which is out of the usual.

These symptoms should be almost, if not quite sufficient for him to arrive at a definite conclusion in the matter. It would be a comparatively easy task for solution when the disease was secondary to its inception in the lungs or joints, though rather more perplexing when the initial invasion was in the ear. An array of indications, like those about to be enumerated, would nearly cover all that can be known until the aid of the microscope comes to make assurance positive. For instance, the grayish spots in the membrana tympani before it has ruptured; the multiple perforations; the rapidity with which the bone yields to disintegration and the absence of pain. This combination is of so much importance that it would be within the bounds of reason and judgment to form a conclusion approximating defi-

* Read before the Harlem Medical Association, Mar. 4, 1903.

niteness without the certainty which the microscope gives.

In advanced cases a characteristic symptom would be the progressive destruction of tissue, even when other symptoms were absent or not sufficiently regarded by the surgeon. The discharge is not often of foul odor, although from the nature of such a case one would be inclined to expect it where the dissolution of bone moves forward in so rapid a ratio. It might be contended that many if not all of the symptoms discoverable to the naked eye are attributable to the existence of a cholesteatomatous mass, but Scheibe avers, "I have not been able to find Koch's bacillus in the cases of chronic purulent otitis with cholesteatoma."

Tubercle has been found primarily in the mucous membrane of the middle ear and in the spongy tissue of the petrous portion of the temporal bone.

Lermoyez mentions that the latent tuberculosis of adenoid vegetations may be the origination of the disease in the ear, a fact which is not without influence when we reflect that these growths present themselves in close contact to the Eustachian canal and that the pharyngeal openings of these ducts are found to be widely dilated when tuberculous infection has invaded the aural structure. These patent orifices may have been the cause and not the result of disease in the ear, affording an easy egress to the bacilli which have remained quiescent in the pharynx, their exact locality not having been suspected. This is another confirmation that these products should always be removed by a competent hand, no matter what their size or the age of the patient.

The aspect of the perforation through the drum is diagnostic. As a rule they are two in number, but a few observers have detected more. Swain asserts, "multiple perforations are considered a sure presumptive sign of tuberculosis and my own experience would lead me to place as high a value upon this piece of evidence as I would upon the presence of a pyriform swelling of the arytenoid cartilages of the larynx, or upon that of a dull apex of the lungs." These openings soon run together to form one large circular perforation with thick, everted edges and a bluish-white edematous look. The deafness is noticed early and is progressive with loss of bone conduction and lowering of the upper tone limit when the labyrinth becomes involved.

It was Schwartz who, in 1878, first described the tuberculous nodules on the membrana tympani. In 1883 Esche demonstrated the presence of the tuberculous bacilli in the discharge from the ear. In mixed infection these bacilli, always few in number, gradually decrease as others increase. They may even disappear altogether as the disease in the ear becomes less severe for remissions and exacerbations are common. In this way cases have been observed extending over a long period of time the general health not having been materially affected. This, however, is not the rule, as it runs a fulminating course destroying every

structure which would impede its rapid onward career.

The treatment must be similar to that which would be pursued in any case of purulent discharge from the ear, antiseptic, stimulating or by using astringents. But the treatment should by no means be localized to the ear, for these patients require active measures to elevate the general lowered condition and to put them in a position to oppose the further advancement of the affection. The otologist should never lose sight of the physician. Operative interference may be resorted to by opening up the mastoid cells if they should be invaded. Curetting away diseased tissue should be attempted with extreme caution, but is practicable in many cases, if precautions are taken not to be too thorough in the desire to remove portions lying over vessels or nerves likely to be harmed.

The case to be reported in connection with what has been said on this subject of tuberculosis of the ear is as follows:

Case.—A. M. C., aged twenty years, of American parentage, was first seen in the beginning of October, 1901. Parents were living and in good health. A brother and a sister had died of phthisis in early adult life. Members of the mother's family had also fallen victims to tuberculous disease. The patient was of a delicate appearance, fair of complexion and anemic. Until the previous winter, however, she had never had any severe or continued illness. At this latter date she had an attack of influenza, the recovery from which was exceedingly slow. The symptoms of this sickness expended their force in the nose and head with some pain in the ears but no discharge from them.

Whatever cough there was soon disappeared. The prominent and lasting symptom was that of lassitude. The patient's disposition had changed from that of cheerfulness to one of deep melancholy.

In the early summer of 1901, she was treated for malaria, or what was so designated, by the family physician. Later on she went to the country where there was a gain in strength and weight. In September, or two weeks before she came to me, on awakening one morning the pillow was seen to be soiled and the left ear was discharging a slightly offensive matter although there had been no previous premonitory signs that there was anything wrong with the ear. This flow was removed and the ear kept clean by the use of the syringe and warm water but no surgical advice was sought until her visit to me.

My examination disclosed the fact that there was an oblong opening in the posterior superior quadrant extending downward, however, beyond a central line. That part of the membrane which was still in situ was pale in color and the edges of the perforation were edematous and everted. The muco-purulent discharge was wiped away so that the tympanic cavity might be inspected as much as possible through the aperture. The mucous membrane was thick and jellified in ap-

pearance; the probe sinking into the softened tissue gave the impression that there was caries of the underlying bone. The part which was most to be noted for this characteristic was directly over the promontory and adjacent to it. The region of the attic did not appear to be implicated.

The absence of pain during any period of the disease was commented upon, especially when there had been such a destructive activity going on. The long handle of the malleus was eroded and a part had disappeared. There was no mastoid tenderness, nor had there been any, so far as the patient was aware.

In the vault of the pharynx there was a small growth of adenoid vegetations which were subsequently curetted away. The pharyngeal orifices of the Eustachian tubes were wide and patent. The larynx appeared to be normal, there being no evidence of any enlargement of the arytenoids or of any congestion along the free border of the vocal cords. The respiratory murmur was clear in all parts of both lungs. There was no history of rheumatic or other pain in the joints at this examination, although this fact was elicited some weeks subsequently, but not, however, until after the right ear had begun to discharge.

Simultaneously with the exit of pus from the ear a loss of hearing was perceived which was steadily progressive in character. Both ears were involved in this deafness. Somewhat later, after the right membrane broke down there was a decided diminution in the upper tone limit lateralized more to the left. There was never any evidence that a cholesteatoma was the cause of the discharge. The case was regarded as one of ordinary otitis media purulenta and was treated in accordance with that view of it. Under treatment the amount of discharge lessened without ceasing totally, while the deafness increased and the subjective noises, hammering in the head, became almost intolerable.

In the last week of December, 1901, there was a discharge from the right ear, painless and gushing out during sleep to be first observed, as formerly with the left ear, on the pillow in the morning. On inspection a few hours later there were two perforations in the lower half of the drum membrane, a narrow strip of tissue separating the openings. From these there flowed a matter of the same consistency as that in the left ear. The probe passed into a jelly-like mass. The perforations were where there had been seen for some time before a clump of what were supposed to be petechial spots but which were in reality the tubercle nodules. A specimen of the exudation from each ear was now submitted for microscopic examination with the report that this investigation proved the existence of the tubercle bacilli in both. The perforations in the right membrane within a few days had coalesced into one large circular one with destruction of, at least, half of the membrane.

During the winter, despite all efforts to bring about a change for the better, the discharge re-

mained practically the same. Curetting was performed several times, which seemed to be of benefit, but in March, 1902, a cough developed and it was found that the lungs were to become a part of the process of destruction.

In May she went away from the city and was not seen again until August. There was then a foul-smelling discharge from both ears which were blocked up with granulations and the deafness was almost complete, with vertiginous seizures.

There was consolidation of the right apex, tumefaction over the arytenoid cartilages, night sweats, emaciation and a constant hacking cough with expectoration. The patient was not seen again.

The inference drawn from this case is that the origin of the tuberculosis was in the ear, but the fact that both ears succumbed would perhaps give evidence to the view that it had begun in the vault of the pharynx extending upward. There is no doubt that the lungs were secondarily involved. Such cases are a witness to what should become a routine practice, to submit to the microscopist for diagnosis and verification the products of an unhealthy discharge not alone from the upper air passages but from the ears as well.

19 West One Hundred and Twentieth Street.

THE PRESENT STATUS OF SOME OF THE PROBLEMS OF TUBERCULOSIS.*

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In March, 1903, twenty-one years will have passed since Koch gave to a waiting and expectant world the discovery of the tubercle bacillus. His treatise on the "Etiology of Tuberculosis" is a model of scientific writing. His observations were so accurate, his researches so far-reaching, his demonstrations so complete, and his deductions so logical that in the years that have passed nothing of any importance has been added to or taken from them by the great host of earnest collaborators throughout the world. This work alone will make his name immortal however Fate or Envy may tarnish the luster of his fame.

The impetus that was thus given to renewed study of tuberculosis cannot be exaggerated. The demonstration that the disease could be reproduced at will in susceptible animals practically made tuberculosis a disease that could be studied in the laboratory with the same degree of accuracy as are chemical and physiological processes, and it is to the laboratory investigators of tuberculosis, of whom Trudeau was the pioneer in this country, that we are indebted for all the advancement of our knowledge concerning the entire subject.

The demonstration that the tubercle bacillus is the essential etiological factor in producing tuberculosis and that it was always present in tubercu-

* The address of the retiring president, delivered before the Syracuse Academy of Medicine, Jan. 6, 1903.

lous discharges, was speedily followed by the convincing proof that its presence could be shown in the dust of infected houses, of churches, of the theaters, of public conveyances, from clothes soiled by expectorations and from the face and hands of the tuberculous. Experimentation and accurate clinical observation soon convinced all that the instances in which it could be conveyed from parent to child were so very few that direct heredity as a causative factor could be practically ignored. The tremendous import of this advance in accurate knowledge is not yet properly appreciated by the people or by physicians. The great white plague had cursed man so many centuries; it had become so familiar to every one everywhere; it had been seen to lay low whole families and to slay in successive generations so relentlessly, that a feeling of hopeless indifference had possessed the minds of men, and to this day much of that sentiment remains amongst the laity and amongst many who practice the healing art.

The other etiological factor, equally important, was recognized by the earliest of medical writers. By them, as by us, it was observed that unsanitary and unwholesome methods of life contributed directly to increase the number of victims of consumption, and of other diseases. They had known that anything which debilitated the individual made him more liable to succumb to disease. They knew the "soil" as well as we, and the most intelligent of them were as keen in advocating a return to natural modes of living as are we. I well remember the words of Professor Alonzo Clark in his lecture on the treatment of consumption. He said "Gentlemen, if I should become afflicted with consumption, I would go up to the Catskill mountains, buy a stage, and drive myself." Accurate clinical observations and laboratory research have conjointly demonstrated that to a congenial soil the universally distributed tubercle bacilli will find their way and will manifest their activities in one of their various modes of expression. This is absolute knowledge and is capable of demonstration to any one who has eyes to see. The problem for us is to see that this knowledge shall be the possession of every person whose mind is large enough to comprehend it, and to insist that sanitary laws must be enforced on those too ignorant to understand or too lazy or too wilful to yield intelligent or willing obedience.

Up to two years ago it was generally conceded that tuberculosis in man and in animals was one and the same disease, having the same essential cause and the same secondary causes, as crowding of cattle in insufficiently ventilated stables, etc.; that whatever differences in manifestations of the disease in man or animals were noted, and whatever variations in the form and characteristics of the bacilli were observed were due to their environment in their host, and that it was possible to produce tuberculosis in man by use of milk or meat which contained the living bacilli of bovine tuberculosis. At the London Congress of Tuberculosis in 1900 Koch, who originally taught this,

gave as the result of his experience with tuberculosis in cattle and in man, some observations which went to discredit the probability that man was ever infected by tuberculosis from the consumption of milk or flesh from tubercular cattle. In the Berlin Congress in 1901 he reiterated this statement and analyzed all of the cases which had been brought to his attention designed to prove the contrary and in a way so masterly that at the end of his argument the cases cited were conclusively shown to be of no value as evidence. You remember the commotion this made, and the consternation it caused among those who had labored long and hard for the elimination of tuberculosis from dairy herds. To some of us it seemed to set back the hands of the dial of progress, and to make necessary another long struggle with the self-interest of the owners of dairy herds. Fortunately perhaps, his ideas were so bitterly opposed by such an array of men of eminent talent and of large influence in agricultural affairs, that the laws of the civilized world regulating the production of milk and the sale of meat were not seriously affected. Different nations and States have appointed commissions to investigate anew this deeply important problem, and a stimulus was given to individual laboratory investigators the like of which has not been seen in all these 20 years. Results are beginning to come in. Already several important papers have appeared, the most noteworthy of which in this country are those of de Schweinitz, who experimented with monkeys, and Ravenel whose conclusion of a most interesting paper, read to the Pathological Society of Philadelphia in April, 1902, is this, "The evidence at hand forces us to conclude that human and bovine tuberculosis are but slightly different manifestations of one and the same disease, and that they are intercommunicable. Bovine tuberculosis is, therefore, a menace to human health." While tuberculosis is a laboratory disease for animals, it is manifestly impossible to experiment on man, and therefore indirect evidence, and the evidence of experiments on man's nearest anatomical relations alone can be used. However, the evidence that other animals like swine and calves and lambs are frequently infected by milk from tubercular cows is overwhelming and not denied by Koch. In the debate in Koch's paper Nocard, in his remarks, said, "I may remind you of the fact established by your (English) chemist Thornton, and which proves the gravity of the danger. The general mortality in England for tuberculosis has diminished in 50 years by 45 per cent. Only one class of the population shows a contrary tendency, that is that of infants of tender years who die of abdominal tuberculosis. In this class the proportion has increased 27 per cent., as compared to a general diminution of 45 per cent. Nothing has been done to improve the sanitary condition of the milch cows and to prevent the sale of milk from those with tuberculous udders." It would seem to me, therefore, that the burden of proof is on Koch's side, and that until he can prove to the

perfect satisfaction of men as skilled in laboratory work and as keen in observation as he is himself that infants are *never* infected by the use of milk from tuberculous cow his case is not won, and that we will be unwise to relax in the least our most stringent rules concerning the sale of the milk and meat from cattle infected with tuberculosis. Under such conditions we can wait with patience until this problem of the intercommunicability of human and bovine tuberculosis is definitely settled.

The *diagnosis* of tuberculous disease in its very beginning is often a matter of great difficulty. After the process has advanced to the production of gross lesions, with their attendant symptoms any one can recognize it. In the meantime the golden opportunity for curative treatment has been lost. In my experience it is not the rule to see a case of tuberculosis at a period so early that it can be rightly termed "incipient." This is due to two reasons; first, to the negligence of the patient himself, secondly, to the carelessness or superficial examination given by the doctor to whom the patient first applies for medical advice for what he considers some trifling departure from health. If we could constantly hold in mind that practically everyone is daily exposed to the tubercular infection and hold under suspicion everyone who applies for counsel who does not present data for a definite diagnosis or who does not show a rapid amelioration of his symptoms, we would not see in the reports from sanatoria the statement that 60 per cent. of applicants sent as suitable for treatment are rejected year after year because their disease had advanced so far as not to give promise of cure. As a matter of fact nature is kinder to us than we are to ourselves or to each other. The reports from the large hospitals in which great numbers of postmortem examinations are made show tuberculous lesions healed or active in at least 50 per cent. of all cases examined macroscopically. Naegeli has reported a successive series of 500 autopsies in a general hospital in which, by the aid of the microscope, he demonstrated the presence of tubercular lesions in 99.9 per cent. of the cases. Welch has said that if such lesions be sought with diligence in all the tissues the proportion will not be found to have been exaggerated by Naegeli. With the universality of the infective principle and the known exposure of city dwellers to it, I do not see how we can escape such a conclusion. The attitude of the physician should be one of expectancy to find the evidence of tuberculosis and he should not rest satisfied in any case under the least suspicion until he has demonstrated beyond the shadow of a peradventure that his patient has or has not a tubercular infection. The cultivated diagnostician will detect the slightest variation on comparative examination of the chest by all the methods known to art. Allbutt has said that he who has not a musical ear should not practice percussion and auscultation in cases in which an early diagnosis is of such great importance. But long before any change has taken place that the

most expert in physical diagnosis can possibly detect the invasion has begun in the lungs, and if we await the evidence to be elicited by the usual methods, and particularly if we wait until the sputum reveals the presence of tuberculous bacillus which always means that the process of ulceration has already begun, we have lost most precious time. Again, the invasion is not always by the lungs but frequently enough in the lymphatic glands of the neck or of the mesentery or in other organs of the body and in such cases an early diagnosis by gross methods is once more impossible. Persistent malaise with loss of appetite and strength and later with a daily rise of temperature of a fraction of one degree with pulse of lowered tension and increased frequency and the onset of a slight cough, combine to make the alert physician suspicious of tuberculosis where no physical signs can be detected. I know of no single observation of more value both in diagnosis and prognosis than accurate thermometry. To make such observations of value one must attend personally to every detail. A thermometer of known accuracy must be used under unvariable conditions by a person most interested to record the exact truth. In my experience I have found I can trust the patient to make such observations as I do not make myself with more safety than I can any one to whom his care is entrusted. Not infrequently before the temperature is elevated even a single degree, the pulse will be changed in frequency and character, especially in persons of nervous temperament. With a careful investigation of the history of each case presenting and attention to the significance of the symptoms just discussed, an early diagnosis can frequently be made before any physical signs manifest themselves and before a single tubercle bacillus can be discovered in an examination of the sputum. If that prove impossible modern science has contributed other methods of diagnosis that will absolutely settle the truth. In 1900 Koch once more set the whole world ablaze by another astounding announcement. This time his message fell on the ears, not only of physicians, but of those in the throes of the dread white scourge. Such an assemblage of notable men eager to learn the truth of his announcement of the discovery of tuberculin and its virtues as a specific for the cure of tuberculosis, and such a mob of sick men and women eager to be cured never was seen in any city as gathered in Berlin immediately after the publication of this news. The announcement of his discovery of the tubercle bacillus was done in the most scientific and open manner. The cure, tuberculin, was held as a secret which he did not give to the medical world until the investigation of others in the same field of work practically disclosed it. Its reputation as a specific in the cure of tuberculosis was short lived. However, much good came of it, for it was speedily proven to be the most delicate test by which to prove the presence of tuberculosis in suspicious cases in which a diagnosis by no other means could be definitely asserted. Its use for

this purpose has steadily increased and to-day the verdict of those most expert in the diagnosis of tuberculosis is that it is absolutely reliable and that if properly used, it is never injurious. Koch has modified his original method of producing tuberculin twice, and now uses what he terms "tuberculin emulsion." This is made by grinding the dried living bacilli for weeks in a mill, then centrifugating the powder suspended in water to throw down any clumps and unground bacilli, then by keeping this recovered product in 50-per-cent. glycerin solution at least two weeks before it is put on the market, which process he claims kills any remaining living bacilli. In the Saranac Laboratory it was proven that his second modification, "Tuberculin Reste," or "T.R.," was capable of producing fatal tuberculosis in guinea pigs, showing that living bacilli were still present in the product sold. A Swiss investigator, Fritz Thellung, has recently published an account of his experiments showing that the specimen of this latest tuberculin emulsion is also not free from living T.B., and caused fatal tuberculosis in guinea pigs. It is evident that care must be taken to exclude the use both of the T.R. and the T.E. tuberculin, and to use for diagnostic purposes only the original tuberculin which is made perfectly sterile by boiling for 48 hours. Concerning the use of this tuberculin for diagnostic purposes I cannot do better than to quote Koch's own words taken from his address at the London Congress in 1901.

"For this (diagnostic) purpose I use the following method. In the first place the patient's temperature is observed for at least one day, or better two, in order to ascertain whether the temperature is below 37° F. Patients whose temperature is above 37° F. are unsuited for the diagnostic application of tuberculin, and ought not under any circumstances to be subjected to the tuberculin test. If the patient is found suitable he receives an injection of tuberculin under the skin of the back in the forenoon; with weak patients one begins with one-tenth milligram; with stronger ones, whose tubercular alterations are probably very slight one may begin with one milligram. If there is no rise of temperature at all, one gives a dose double as large as the first, not on the next day, but on the day after the next; but if there is a slight rise of temperature, only a quarter of one degree, for instance, the dose is not raised, but repeated as soon as the temperature has gone down to the normal level. It very often happens that, though the same dose has been given, the second reaction is stronger than the first. This is quite specially characteristic of the effect of tuberculin, and may be regarded as a quite infallible sign of the presence of tuberculosis. But if the first small dose produce no reaction one gives five and even ten milligrams. For certainty's sake I am accustomed to give this latter dose twice, and only when no reaction occurs do I feel justified in assuming that the case is not one of fresh or progressive tuberculosis demanding specific treatment." Without question this is the

most delicate diagnostic method which we can employ to-day. Koch reports its use in 3,000 cases. Evidence of its usefulness has recently been published in a careful paper by Dr. J. D. Madison, who reports 40 per cent. of reactions in 400 women in the Danvers Insane Hospital in Mass., to whom it was given experimentally.

The use of tuberculin for diagnosis is not without its opponents, some of whom have claimed to observe injurious effects. Dr. Trudeau assures me that in all the cases in which he has used it there has never been any but temporary discomfort from the reaction. He is careful never to exceed a dose of 10 milligrams. In discussing the possible dangers from its use Dr. Madison says, "In considering the dangers of tuberculin, it is well to remember that we continue to use chloroform and ether for diagnostic purposes, notwithstanding the fact that many deaths are known to be caused by them; and surely there are few diseases in which an early diagnosis is more important than in tuberculosis." But we have another method of diagnosis, not so delicate and not so easily applied, and, in fact, useful only in the hands of a skilled and trained observer, in the X-ray. Dr. Baldwin of Saranac tells me that with our Fellow Dr. Clifford Mercer they made use of the fluoroscope to a considerable extent during the past two winters and that they found it of value in about 5 per cent. of the cases examined. It may well precede the use of tuberculin and diminish to some extent the number of cases in which tuberculin may prove a necessary test. He who has a constantly expectant attitude of mind, power of accurate observation, trained skill in physical diagnosis and can avail himself of the services of a Weigel or a Williams with his X-ray photographic plates or his fluoroscope, and who, when necessary, can follow the accurate directions of Koch in the use of tuberculin and can accurately estimate the reaction produced, cannot fail to detect tuberculosis in its very earliest manifestations in such cases as present themselves for diagnosis.

The present status of the *prognosis* in tuberculosis shows a marked change from that of twenty years ago. Throughout the world the number of deaths from tuberculosis is gradually decreasing, even with our present insufficient means for caring for the tubercular poor. England heads the list and shows a decrease of 45 per cent. in deaths from tubercular diseases in the last fifty years. In our own State there has been a gradual decline but in no such proportion as is shown by England, though for the past year a death rate of but 2.7 per cent. per 1,000 is shown in Greater New York. That the death rate is still appalling the following figures taken from a recent publication of the commission for the establishment of sanatoria in New Hampshire are proof. An analysis of all the reported cases from 1884 to 1901 showed that from the age of twenty to thirty years the deaths from tuberculosis were 40.72 per cent. of all deaths in that decade of life; from thirty to forty years they were 31.38

per cent.; from forty to fifty years, they were 19.53 per cent. But the reports from modern sanatoria for the treatment of tuberculosis show conclusively that the prognosis is the more favorable in exact proportion to the period at which the cases come under treatment. The earlier the case comes under treatment the better the prognosis. Dr. Trudeau reports that during the years 1897, 1898 and 1899 72 per cent. of incipient cases were discharged apparently cured, while only 17.8 per cent. of advanced cases recovered. Dr. Bowditch, of Boston, reports that, of purely incipient cases, in 79 per cent. the disease was "arrested," while of a total of 201 cases, 42.23 per cent. showed arrest of the disease process. Dr. Weicker of Goerbersdorf stated at the Berlin Congress that 97 per cent. of the cases received in the "initial" stage and discharged as cured in 1896, 1897 and 1898 were at work on Jan. 1, 1899, while on the same date, of those who were classified as "advanced phthisis with destructive process" and were discharged in the same year 77 per cent. were dead. Such figures might be multiplied but these suffice. They all teach the same gravely important lesson, that the prognosis is good or bad according as the patients come under observation and scientific treatment early or late. But there are some other words to be said on prognosis. We have all of us seen cases that have advanced to cavitation that have recovered and have remained well for long periods. I could give several such examples from my own notes of men who are living and working and in whom I demonstrated the existence of cavities of considerable size, 5, 10 or 15 years ago. On the other hand we have all seen cases which we have watched from the first faintest signs of disease or who have had the best opportunities to recover who have gone from bad to worse and have speedily died in spite of all efforts in behalf of their recovery. In a person of good parentage from a physiological point of view, who has inherited a good degree of resistance, there is hardly any stage of tuberculosis in which recovery may not be possible. Of all diseases tuberculosis is the one which is fullest of surprises. The *prognosis* of tuberculosis is thus seen to be generally better than it was 20 years ago, and is the better the earlier the disease is recognized, and put under the treatment which to-day is recognized as the best.

One of the most interesting and important problems is the question of *immunity*. In the light of such reports from the post-mortem chamber as those of Naegeli it is questionable if there be any such thing as natural immunity. Of course those cases were those of city dwellers of the lower classes, but if the perfect specimen of manhood produced under the most favorable circumstances in the country were subjected to similar conditions is there good reason to think that he would go unscathed? The natural tendency to recovery from disease is recognized by all. It is the "*vis medicatrix naturæ*"—but this is not immunity. The gift of bodily perfection and the

wisdom to maintain it are more to be desired than any immunity which science can confer. But few of us have this gift, and more of us fail to keep intact such inheritance as we have, and so the impetus to investigators to find that which shall give the human race immunity from tuberculosis which shall equal that conferred by vaccination against smallpox is not wanting. An immense amount of work has been done along this line and never more than at this moment. The attitude of laboratory workers is that of hopeful expectancy, almost faith, that that which has eluded them so long will shortly be discovered. In 1893 Trudeau published a series of cases which went to show that vaccination of susceptible animals with T.B. attenuated by repeated tube cultures for a number of years protected them from developing tuberculosis when inoculated with T.B. known to be virulent and which proved fatal to unprotected control animals. These guinea pigs died after two years and were then found to be tuberculous, but they had lived two years longer than the controls, and two years of a guinea pig's life would correspond to two decades of the life of a man. In 1894 de Schweinitz reported some experiments giving similar results. Recently renewed interest in the question of immunity has been awakened. In 1901 von Behring conducted a series of experiments on cattle, repeating the work of Trudeau on rabbits and guinea pigs. By vaccination of cattle with human T.B. grown in tubes for a period of six years he has made them apparently immune to virulent bovine T.B., at least they have survived the inoculation, while the control animals succumbed with acute miliary tuberculosis. Pearson and Gilliland have repeated and confirmed von Behring's results on cattle. After a sufficient time shall have elapsed to determine whether this apparent immunity is complete and that the immunizing serum is innocuous and after it shall have proven successful and harmless to animals more nearly allied to man than are cattle, it can then be safely tried on man himself. When the immunizing serum shall have been produced it will be available for therapeutic purposes. Until that glad day shall come we must proceed on principles already laid down, which have proven so successful in the hands of those who use them.

In the *treatment* of tuberculosis there are certain general principles which cannot be too often repeated. The physician himself must first become thoroughly permeated with the truth that tuberculosis is a curable disease, curable more readily the earlier it is detected, but curable, under the most advantageous circumstances in a considerable percentage of cases, in every stage of its expression. This idea has not yet possessed the profession, and in my opinion the present death rate of tuberculosis is greater than it should be from this very fact. I am conscious of no greater responsibility than that which is assumed by a physician with a live conscience who takes upon himself the care of a tubercular patient. When one is inclined to be pessimistic and to feel

that whatever his efforts the battle will inevitably be against him in the end, let him think of Trudeau and his great achievements and of a host of other noble men who have been his patients and his pupils, and of a long list of other men in our own profession who have themselves been tuberculous and to whose untiring and intelligent efforts we owe the present favorable outlook for those once without hope. At a dinner at Denver last summer at which were seated those whose names are familiar to all phthisiotherapeutists I asked my neighbor how many of the physicians at table had come to Denver because of their lungs. After a rapid survey of the company he answered "All but two—and they came because their wives had tuberculosis." Because of the records from modern treatment and because of my personal knowledge that a large number of our own profession who have contributed grandly to the progress of the world of science, have been cured, I wish to emphasize the fact that the first essential for the successful treatment of tuberculosis is an enthusiastic belief in its curability. When you are yourself imbued with this spirit you are prepared to communicate it to your patient. When the diagnosis is accurately made the next duty is to take your patient fully into your confidence. He is to be encouraged to plan a campaign, not a battle, against an enemy who is completely revealed and whose maneuvers can be accurately determined day by day. He is to share your enthusiasm, and he himself is to be on duty to detect each evidence of advance or of recession. I have never seen anything but good from such a method of procedure. My patients are all taught the nature of their disease, its natural history, all the essential points in the management of it, and they have proven my most reliable observers of temperature and of all data that do not require the special fitness of an educated medical mind. Intelligent obedience to commands that are seen to be based on correct principles is willingly given, while the perfunctory following of orders simply because they emanate from a selected physician lacks spontaneity and soon grow irksome. This feeling of enthusiastic hopefulness and of implicit faith in one's medical adviser has often won the day when all things looked discouraging indeed. It seems to me that this mental attitude on the part of both physician and patient, which is so essential, has become possible only as the result of accumulating evidence, increasing year by year from laboratory investigation and from clinical observation during the past two decades. If it be asked "Is there a cure for consumption?" the answer cannot be "yes" or "no." The verdict of this moment in the twentieth century is that there is no "specific cure" for this disease, in spite of the assertion of many who have access to medical journals and even to the privileges of a Congress for Tuberculosis. If one reads the Transactions of the Congress for Tuberculosis which met in London in 1900, and which is only recently accessible in full in this country, he must be struck by the fact that while the most eminent men in

the field of medical science took great parts in this notable gathering, there was no attempt to rule out those who came with a pet fad. Although laboratory investigators have proven the fallacy of every specific treatment that has yet been proposed, by accurate and convincing experiments on tuberculous animals, you will find here papers advocating as specifics "izal," "igazal," "formaldehyde," "phosphate of lime," "natural serum," so-called "antitoxic serum," "urea," the "Crotte method" by which formaldehyde is supposed to be shot through the lungs by the aid of an electric spark, and so on. If tuberculosis were not a laboratory disease and if all proposed remedies had first to be tried on man instead of on animals, and if evidence depended only on clinical observation, we would certainly be at sea. In a disease essentially chronic, which under favorable circumstances tends to recovery, clinical evidence is least valuable. In a recent address by Trudeau on "The History and Work of the Saranac Laboratory for the Study of Tuberculosis," read before the Laennec Society at Johns Hopkins Hospital, he said, "We soon learned that the tubercle bacillus bore 'cheerfully' a degree of medication which proved fatal to its host," and "While they (proposed specific germicides) had no influence on the tuberculous process, they often tended to shorten the lives of the treated animals," and further on, "Neither our serums nor any of those proposed by other experimenters were found capable of saving a tuberculous guinea pig from a fatal dose of tuberculin." In the light of such evidence only the self-deceived or the deceiving could possibly say that a "specific cure" had been found for tuberculosis.

This negative answer to our question disposes of all attempts at treatment directed against the invading host, the tubercle bacilli, but a powerful and affirmative answer comes when we gather the evidence concerning the effects of treatment directed to the host invaded, the infected man. All of the greatly improved results which modern medicine is recording are due to our successful efforts, as Otis puts it, "to develop and strengthen the resisting power of the consumptive until his pulmonary tissue presents no longer a favorable soil for the infecting germ." The essentials of this treatment seem simple—rest, generous feeding, and life in the open air. Do you remember that significant experiment of Trudeau's away back in eighty-six, when he inoculated a lot of rabbits with tuberculosis and consigned one-half of the number to the free life of an island in an Adirondack lake, and the others to a life under conditions as unhygienic as he could devise? The latter were all dead in three months. The lot set free on the island all "recovered or developed only a localized disease."

By rest is meant not only rest of body but rest of mind as well, so that in considering the separation of a patient from his home, his dependency on home friends and the conditions under which he leaves them must be carefully weighed. Homesickness has thwarted many well laid plans, and

worry about the support of his family has destroyed the beneficial effects of the open air treatment in the case of more than one infected bread-winner.

The details of diet need not be discussed. It would be an experience of great value to any physician to dine at one of the recognized sanatoria. The abundance and variety of nutritious and well-cooked food served to patients would illustrate the extent to which hyperalimentation is successfully carried better than any words could do.

The success of the open air treatment has been so marked that many explanations have been proposed to account for it other than the simple use of ordinarily pure atmospheric air. It will be remembered that, when the Adirondack region was beginning to be exploited as a desirable region for the tubercular, Dr. Loomis proposed an explanation for the superior advantages of the forests, asserting that the evergreen trees had the power of converting the oxygen of the air into ozone. I remember to have been much impressed by this explanation, but the relentless experimenter soon disposed of this theory, and ozone was found of no more value than the ordinary admixture of oxygen in the air we breathe. The temperature of the air was then investigated. It was shown that the growth of the tubercle bacillus was inhibited by a temperature above a certain point. As a practical result it was proposed to treat the tuberculous with superheated air. Many interesting devices were made by which this idea could be carried out. Again it was proven that the tubercle bacillus could not grow luxuriantly if the temperature was kept below a certain point. This resulted in the explanation that the great good of the open air was due to bathing the affected area in air at a temperature below that at which it developed readily. The physiologists had always taught that the temperature of the air below the trachea was practically unchangeable by external conditions of temperature, and that the tissues of the lungs did not differ from other tissues in the body in maintaining an unvariable temperature under usual conditions. The laboratory investigator soon settled this question by demonstrating that the temperature of the lungs was not changed by the change in the temperature of the inspired air, and so the conception that the *bacilli inside of tubercles* were chilled by the low temperature of inspired air and so inhibited, or were discouraged by a temperature higher than 100° F. had to be abandoned, though it has died a slow death. In fact man's ability to stand high and low external temperatures had long been considered to be due to such a physiological mechanism that neither high nor low temperatures under normal conditions of the individual could materially change the normal body temperature. The repeated observations that patients did better in winter than in summer in many of the sanatoria was taken to indicate an advantage due to the temperature, but such an advantage is explained

by the greater activity of the metabolic processes, calling for a greater consumption of food in winter than in summer, and to the increase of the sense of well-being brought about by an improvement in digestive ability, which brings with it also an increase of reserve power and of resistance. That there is a definite and measurable change in atmospheric conditions from the level of the sea to the tops of lofty mountain peaks is certain, and for ages physicians have made use of this knowledge. That this can be made use of in various cases to the great advantage of patients is unquestionable. The accumulated evidence of the relative curative properties of the pure air of the sea level or of elevated regions is of great significance and needs to be carefully studied by the ærotherapeutist. It has hitherto been taught that the individual who develops tuberculosis is more rapidly cured in a climate marked by conditions different from those under which he developed the disease. I have seen many examples which served to illustrate this fact. The resident of a region low in elevation and heavily charged with moisture has made apparently more rapid advancement in moderately high regions where the air is dry. I have seen several instances of the reverse of this, where individuals who had become tuberculous in the high and comparatively dry climates of the western table-lands have speedily recovered at such a place as Lakewood. But recently the experience of sanatoria at different localities has seemed to indicate that this selection is not of such importance as it has been considered. I am not yet prepared to give adherence to this dictum, but I am convinced that, under favorable circumstances, a tuberculous patient *can* recover in any kind of an atmosphere, provided it is mechanically and bacteriologically clean, and is enjoyed continuously day and night, and I am inclined to think Dettweiler is right in asserting that it is important that a man be cured in the climate in which he expects to carry on his business. This last statement, and its confirmation in the results obtained in local sanatoria for the poor, puts a new phase on the subject. It means that hope can be given to those to whom it is impossible to say that a prolonged residence at far distant places is necessary because for so many such a method of treatment is beyond the limits of the possible. Without attempting a complete discussion of this subject, for which the limits of this paper would be insufficient, let us take up the last of the problems it is proposed to review to-night: *What should we do with the tuberculous poor?* The condition of this class of society is pitiable beyond expression. In the family of the laboring man at least the position of the husband and wife is equal in importance. If the man is laid low, income ceases, if the woman is the victim of disease, the wages are not sufficient to meet the uncommon expenses. The state and the municipality has a duty to them which it has been slow to recognize but which is imperative. The general hospital of cities and towns is shut to the tuberculous poor,

and, on sanitary grounds, this is right. But it is not right that no provision should be made for this class of cases save what is furnished by the hospitals of county poor houses. If these are used they are found to be but places in which the disease may run its course unchecked and without any attempt to make use of the modern treatment of tuberculosis. The most accurate reports from sanatoria for the treatment of tuberculosis show that at least 75 per cent. of the incipient cases can be arrested, and that a larger number than that can be so far restored to health as to return to avocations that will permit of self support. This is an enormous advantage economically to the State. If we compare with this the results obtained in our state hospitals for the treatment of the insane we will find that the outlook for recovery for the cases of incipient tuberculosis is greater than that for the insane.

Through the kindness of Dr. Hutchings of the St. Lawrence State Hospital for the Insane I have been furnished with these statistics:

"RECOVERIES IN THE ST. LAWRENCE STATE HOSPITAL.

Year Ending.	Original Commitments.	Recoveries.	Percentage.
Sept. 30, '02.....	264	89	.337
" " '01.....	285	87	.305
" " '00.....	268	81	.302
" " '99.....	300	93	.310
" " '98.....	281	81	.288

"In addition to the above there were discharged in a greatly improved condition, but not actually recovered, the following: 1902, 25; 1901, 29; 1900, 45; 1899, 35; 1898, 37.

"The cases considered as improved were in the great majority of cases able to resume their usual employment but still entertained some peculiarities which would distinguish them from so-called recoveries in whom no mental symptoms whatever remained." This creditable showing for one of our large state hospitals for the treatment of the insane has been accomplished by the State of New York at an outlay for the entire state of no inconsiderable sum as these figures kindly furnished me from the Comptroller's office will indicate: "The amount expended by the state for building, equipping and furnishing the state hospitals for the insane, to September 30, 1902, is \$21,605,065.29. For building, etc., Craig Colony for Epileptics, the only state institution of the kind, the amount expended for the same period is \$783,776.85. The total number of patients in the state hospitals on September 30 last was 23,265, and in the Craig Colony for Epileptics, 826. The amount of payments by the state, for the fiscal year ending September 30, 1902, for the maintenance of the state hospitals for the insane was \$3,777,529.45, and for the Craig Colony for Epileptics, \$128,000."

We are proud to be residents of a State which cares for two classes of unfortunates so bountifully and so successfully. I am not in possession of official statements from Craig Colony, but the general impression is that such an institution can-

not hope to be curative but only a hospital for detention. That the great good done by such institutions could be more than equaled by the scientific care of the tuberculous poor the following communication recently received from Dr. Vincent Y. Bowditch is convincing: "Most certainly I believe that every dollar expended by Massachusetts for the State Sanatorium at Rutland has been more than repaid, not only by the good done to the individual sufferers from tuberculosis, so many of whom since their stay at Rutland have become wage-earners again and a large percentage of whom have remained to all intents and purposes perfectly well since, but on account of the educational effect upon the whole community in showing what the simple and essential laws of hygiene will do for the prevention and cure of disease. If we can make people wage-earners again, how much more valuable such institutions are than those which are merely resting-places, however essential they may be, for the poor insane and epileptics who are of little or any use to themselves or the community at large. I cannot speak too strongly to express my feeling in favor of the establishment both of sanatoria for the hopeful cases by the State, and also of hospitals in cities and counties for the hopelessly sick, to be under the supervision of the municipal and county authorities." The State of New York has done something. Two years ago, as the result of a movement which this writer had the honor of first proposing in the Medical Society of the State of New York in a paper read in 1896 and which was most ably carried to an issue in 1900 by a symposium on "State Care of the Tuberculous Poor" planned and executed by one of our ex-presidents, Dr. Henry L. Elsner, the State of New York made an appropriation of \$100,000 for the establishment of a State Hospital for the treatment of incipient cases of tuberculosis among the tuberculous poor. It was my privilege to observe last week that the cellar had been commenced at the selected site, Ray Brook, four miles from Saranac. Of course this hospital when completed will be wholly inadequate to care for more than a very small fraction of the cases suitable for admission within its walls. But it will mark the beginning of better things to come. If it shall be free from political control and be given to the most scientific treatment of selected cases it will not be long before its records will prove inspirational to our legislators, and from this will doubtless grow a more intelligent policy in the care of all curable cases of tuberculosis. But accessory to State hospitals there must be in every county and near every city of the first and second classes in our State, local hospitals for the tuberculous which shall receive all cases and in which cases can be watched sufficiently long to determine whether they are suitable for treatment in State institutions or whether they should remain permanently in local institutions. Such hospitals must be so controlled as not to be made simply hospitals of refuge to which no self-respecting tuberculous patient would be willing to be consigned; they

must be managed with all the attention to details for curative institutions that modern skill can devise; they must have a corps of medical officers that shall command the respect of the community at large, and they must be independent of the county poor house. To the end that our own city shall soon have a hospital that shall meet these demands, the influence of this organization is necessary. But while we wait hopefully and expectantly for the consummation of this plan, we need not be inactive. The example of the Greater City of New York which has greatly ameliorated the condition of the city's tuberculous subjects and has already effected a marked diminution in the death rate for consumption is before us and is worthy of imitation. The plan conceived and executed by Dr. Hermann Biggs and his coadjutors has proven so comprehensive and so successful that it has had the favorable commendation of the great Koch himself, and, until more perfect measures can be carried out, it should receive our earnest study. This Academy should support our local Board of Health which has undertaken to carry out most commendable provisions, particularly those which aim at the education of the people in a correct knowledge of what tuberculosis is and how it can best be avoided and prevented. In the campaign of education the local authorities might well invoke the cooperation of all sick benefit societies, industrial insurance companies and all large manufacturing concerns.

At the risk of imposing upon your patience I have gone over superficially some of the most important of the problems of tuberculosis. No attempt has been made to treat any topic exhaustively, and only those most needing emphasis have been touched upon. It is only by repetition of such well-known facts as have been here gathered together that we can awake in the public and in the profession a proper appreciation of the importance of a subject that has become so familiar to us that it has almost "bred contempt." This awakened interest would be manifested most effectively by the establishment in every city of a Society for the Prevention of Tuberculosis.

MEDICAL PROGRESS.

OBSTETRICS AND GYNECOLOGY.

The Treatment of Gonorrhœa of the Uterus.—This depends on the situation and chronicity of the disease; according to the judgment of GEORGE W. NEWTON (Am. Jour. of Obstet., May, 1903), it is difficult to destroy the gonococci in the uterus as the ducts of the Naboian glands of the cervix furnish a most excellent hiding place and that it is difficult to get at them with either drugs or the curette. They may also have penetrated the muscular structures so that it is impossible to reach with the curette. When the disease is limited to the cervical canal the discharge should be removed with the author's brush. This brush will remove the tenacious discharge in a second's time most perfectly. Then to the membrane which lines the cervix, a mixture containing 40 per cent. of carbolic acid and 60 per cent. of iodine should be applied with prepared cotton on an applicator, care being taken that none of the mixture

goes beyond the internal os. If there is much erosion about the external os after making the application of iodine and carbolic, a tampon wrung out in one per cent. creoline should be inserted into the vagina, and the patient should use daily douches of creoline. The applications to the cervix should be made twice a week. After the disease has gone by the internal os the treatment varies with the chronicity of the disease. If the gonorrhœal process is subacute put the patient to bed, prepare her as carefully as if she were to have a hysterectomy performed, dilate the uterus carefully but thoroughly, then flush the uterus with two quarts of sterilized water; follow this with a few ounces of a one-per-cent. solution of protargol, then lightly pack into the uterus gauze saturated with two per cent. protargol. Allow this gauze to remain in the uterus for twenty-four hours, at the end of which time it should be removed. If the disease is chronic exactly the same procedures should be carried out except that the uterus is curetted with a sharp curette. It cannot be stated at the present the exact percentage of the cases of gonorrhœa that can be cured by these methods of treatment. Six cases treated by the author after this fashion have been apparently cured as the secretions from the vagina and uterus failed to show the presence of the gonococcus. Six months after they had been operated upon, the symptoms had also disappeared.

Treatment of Cancer of the Cervix by the X-ray.—Of all the conditions which the gynaecological surgeon is called upon to treat or operate upon, there is none quite so terrible as, or more painful in all its manifestations, than cancer of the uterus and its appendages; furthermore there is no condition where the major proportion of the cases finds us so helpless or powerless to bring about a radical cure. THOMAS P. SCULLY (Ann. of Gyn. and Ped., May, 1903) says that during the past year several men have been investigating the use of the X-ray in such places within the body as the rectum and vagina; and, while each was still unaware of the other's endeavors, all have arrived at practically the same conclusion as to the manner in which the X-rays could be used successfully. E. W. CALDWELL of New York City has described a specially constructed tube for this purpose. It is a unique contrivance and certainly has many excellent features to recommend it. Prof. PENNINGTON of Chicago, has devised a shield of metal which is clasped around the X-ray bulb; this shield has a cylindrical prolongation which can be used as a speculum or to which a speculum can be attached, and through which the rays are concentrated on growths in the rectum and vagina. The author reported three cases of cancer of the vagina in which he had employed the X-ray treatment in all of which there had been some varying degree of success, and states that at the present time in certain cases of cancer of the cervix, nothing short of complete removal should be attempted, but in the later stages of the same condition where the vaginal vault is involved and also the body of the uterus, it is highly improbable that more than temporary relief can be given the patient by surgical means, it would certainly seem that the X-ray treatment should be resorted to.

Rational Treatment of Puerperal Infection.—The opprobrium of our twentieth century medical science is the inconsistency of our teaching and practice regarding the prevention and treatment of puerperal infection, remarks H. G. WETHERILL (Am. Jour. of Obstet., May, 1903), for while its pathology and etiology are known the proper methods of prophylaxis for its control are not practised. The remedy at hand is the application of truly surgical methods to obstetrical procedures as in other surgical operations. Confinement in hospitals

should be advised, especially for those in moderate circumstances, with whom the proper aseptic handling is almost impossible at their homes. This will not only minimize the risks from sepsis, eclampsia and all other forms of dystocia, but all possible complications which may arise may be comfortably handled there by the surgeon. This writer insists upon the use of rubber gloves and fewer vaginal examinations as the true method of prophylaxis. The uterine curette does a vast amount of harm in all varieties of true septicemia, through the dissemination and distribution of the infectious material, and the opening up of new areas of absorption. The administration of an anesthetic adds not a little to the seriousness of curettage in that it gives extra work for a kidney already taxed to its limit. When the pulse is over 120 the patient should not be given an anesthetic. Of the vaginal and intra-uterine douches, but little need be said. The antiseptic solutions ordinarily used may do some good, but are capable of doing great harm if injudiciously or unskillfully used; we now possess better, safer, and more easily applied means to the same end. Antistreptococcal serum is mentioned, to be condemned along with unguentum Credé. Laxatives and purgatives are condemned as they weaken the patient, whereas the object to be sought for is one of stimulation. Whisky, caffeine, spartine, digitalis, quinine, are all valuable as sustainers, as is also adrenalin chloride, and may be used in conjunction with the other lines of treatment. The best results are to be obtained through the rigid application of the same methods as are employed in other intra-abdominal infections, with the additional use of drainage tubes and the intra-uterine irrigations of alcohol as advocated by K. Carossa, in 1896, and first brought to the attention of Americans by Dr. Ed. J. Ill of Newark, N. J., in 1897. Tubes and gauze may be left in situ from two days to two weeks, being kept free from obstruction with débris by the strong action of a good piston syringe. As to the results of the method, the author compared them to those witnessed some years ago in diphtheria from the use of antitoxin, for if it be instituted sufficiently early, that is, before general sepsis and diffuse peritonitis are established, the temperature, pulse and general expression of the disease were rapidly altered for the better, and even in one desperate case of general sepsis, with extensive embolic pneumonia and diffuse peritonitis, the patient recovered.

Degenerations and Complications of Fibroid Tumors.—The classical teachings concerning the life history of these growths, their degeneration, complications and dangers are far from correct, hence C. P. NOBLE (Am. Gyn., April, 1903) urges the necessity of a more careful study of these growths in order that they may be dealt with from a more scientific basis rather than from the old traditional standpoint. In estimating the risks encountered by patients suffering from fibroid tumor, there should be considered first those growing out of complications, which will be classified as follows: (1) Those which would lead to a fatal result; (2) those which would threaten the life of the patient; and (3) those which would involve more or less invalidism. It is difficult to estimate the number of patients that would die from the effects of hemorrhage; chronic anemia leading to degeneration of the heart and kidneys; to pressure of the tumor on the ureters and bowels; to malnutrition induced by hemorrhage and by the increase of intra-abdominal pressure interfering with the functions of the alimentary canal; to the lowered vitality of the patients increasing their liability to intercurrent diseases; to septicemia from necrosis of the tumors; and to thrombosis through the associated phlebitis and to the subsequent degeneration of uncomplicated tumors.

To these must be added the risks of pregnancy and parturition when complicated by fibroid tumors. Of 100 intra-abdominal operations performed by the author, 46 were unchanged fibromata, 2 showed telangiectatic changes, with non-encapsulation and abnormal diffusion through the muscle, and 52 presented pathological degeneration, 27 edematous or myxomatous, 1 myxosarcomatous, 5 cystic or fibrocystic, 1 calcareous and 18 necrotic. Pain, as a predominant symptom, is thought to be an indication of degeneration, it having been noted in two-thirds of the necrotic cases, in three-fifths of the cystic cases and in one-third of the myxomatous cases. The age of the youngest patient operated upon was twenty-three years, the oldest sixty-three and the predominance of cases was between the ages of thirty-five and forty-five years. An analysis of 668 cases of fibromata in the hands of four surgeons shows a mortality as follows: Martin, 16 per cent.; Noble, 16 per cent.; Frederich, 23 per cent.; Cullingsworth, 24 per cent. These are cases in which there was degeneration or complication without operation. No instance of a fibroid having disappeared after menopause has come under the author's notice. One case, seen fifteen years ago, was said to have lessened after pregnancy. It is a conservative statement that one-third of the women having fibroid tumors will die if they are not operated upon. The mortality from myomectomy varies between 2 and 10 per cent. depending upon the operator, the gravity of the case, the environment and upon the operation performed. It seems a fair conclusion that those resorting to an early operation will save from 30 to 35 per cent. in mortality. It seems to the author that the attitude of the text-books should be changed or reversed, and the rule should be to remove all fibroids that come under observation, unless, in a particular case there seems to be reason for temporizing, either because of the small size of the tumor or the advanced age, or to the general health of the patient.

Veratrum in Puerperal Eclampsia.—In this disease the convulsions occur very suddenly and without warning. The patient may suddenly cease speaking, the eyelids begin to twitch, the eyes become fixed or roll from side to side, the muscles of the face or the extremities jerk. The tongue may be badly bitten, the muscles of respiration may be involved in the spasm. The face is bloated, dark-purple, the features distorted, and the picture is a terrible one for the beholders. One attack follows another in quick succession. If dropsy occur or albumin appears in the urine during a pregnancy the patient should be kept in bed on a milk diet. Basham's mixture may be given with advantage. When the convulsion occurs there are two indications: elimination of the poison and sedation. The plan of J. S. HAMMOND (Ann. of Gyn. and Ped., June, 1903) is to control the convulsion by chloroform inhalation, give a hypodermic of 10 to 15 drops of tincture of veratrum viride, and examine bladder and rectum. Repeat the veratrum every twenty minutes till the pulse is below 60. The veratrum acts as an emetic and diaphoretic, and, in addition, the bowels may be moved by one-quarter grain of elaterium mixed with butter and placed on the back of the tongue, or by two or three drops of croton oil in a teaspoonful of olive oil. Hypodermoclysis will promote diuresis. Obstetric interference is not justifiable, for though the child may be the predisposing cause of the eclampsia it is not the exciting cause, and the hurried operation only adds to the existing toxemia, the dangers of irritation and traumatism. Leave delivery to nature whether the child is dead in the womb or not.

A New Speculum.—An example of the villainies of special instruments is furnished by a new self-retaining vaginal speculum, suggested by S. SPIEGEL (Centralbl.

f. Gyn., June, 1903). Without describing the details of the device, it is sufficient to point out the one feature which the inventor thereof seems to have totally forgotten. It consists, briefly, in a speculum which is fastened rigidly to the table by a series of arms and clamps. It would need only a struggle on the part of the patient during imperfect anesthesia, to do herself incalculable damage. It is really strange that ingenuity enough to devise such an apparatus should not be accompanied by common sense to see that the dangers far outweigh the advantages of the invention.

Ectopic Gestation.—Formerly considered to be a very rare condition, the trend of modern thought is toward the opinion of an almost constant relation between ectopic gestation and pelvic hematocoele. J. H. STEALY (Am. Gyn., May, 1903) believes that the trouble lies chiefly in the different views on the relation between these two troubles. If most of the blood extravasations in the pelvis are to be considered to be the effects of tubal pregnancy, then, indeed, the cases will be found to be very numerous. The only right that we have to call a pelvic hematocoele a result of an extra-uterine pregnancy, is the absolute identification of decidual cells or chorionic villi, or the presence of a fetus. In a disappointingly large number of women it is impossible to get any suggestive history that might help us in solving the problem of etiology. And in the consideration of this question the author assumes as facts, a priori, that: (a) impregnation normally occurs in the fimbriae of the tubes as shown by Strassman, Mandl, Hofmeier, Heusen and others; (b) the ciliary currents are downward from the fimbriae to the cervix, as stated by Kelly; (c) the denudation of the epithelium of the uterus or the tubes is not necessary to the implantation of an ovum (Dudley). The more the subject is reviewed the more evident is the fact that we can lay at the door of no cause the fault of this condition. Broadly stated, any condition which absolutely prevents the egress of the impregnated ovum from the tube, or delays its passage until by its rapid growth it has become too large and heavy to be moved by the action of the cilia and the peristalsis of the tube, is a condition favoring tubal pregnancy. These conditions may be extrinsic or intrinsic, or acquired or inherited. The woman may have all the signs of pregnancy except the absence of her menses, and this should put us on our guard; or she may state that her menses had stopped for a month or so, and that she considered herself pregnant, when upon the re-establishment of the flow she believed herself mistaken. The symptoms of tubal rupture and abortion are those of pelvic hematocoele and consist of all the evidences of severe internal hemorrhage and shock. When the rupture be into the cellular tissue of the broad ligament, the pain and shock will be intense. If a small vessel alone be lacerated the fetus may die and the patient go on in perfect health with a diagnosis of colic. In general, we may say that the etiology, signs, symptoms and treatment are as follows: Cases of ectopic gestation are by no means infrequent, and are among the most serious conditions with which we have to cope. Generally they occur in those near middle life, having a previous history of sterility. The symptoms that are to be carried in mind are: (1) The woman will have missed a period; (2) colicky pains; (3) bloody discharge from the vagina or an irregular continuation of menstruation, often leading the woman to believe herself pregnant. With few exceptions and these are dependent only on the woman's welfare, the indication for immediate operation in these cases is absolute. No case of "colic" in a woman capable of procreation, more especially one married, should be allowed to pass unscrutinized, without the thought of

ectopic gestation in mind. And to be emphasized a thousandfold, is that no such symptom in a pregnant woman should be lightly regarded. Even though in many hundred cases, as it will be, our care results in nothing but a transitory diagnosis that passes through our minds, yet some time, to some woman, it may mean her life.

Gonorrhreal Puerperal Fever.—In summarizing the chief essential points regarding this condition, FRED. J. TAUSIG (Am. Gyn., April, 1903) gives the following as the most important. The gonococcus is the etiological factor in about one-sixth of all cases of puerperal infection. Although secondary to a gonorrhreal infection elsewhere, this trouble involves an infection of the puerperal wounds, and hence must be classified under the head of puerperal fever. The gonococcus may gain access to the uterine cavity without any internal examinations being made. Many a case of so-called auto-gogenous infection may be explained in this way. More frequently the process is brought about by digital manipulations and operative procedures, particularly intra-uterine, in the delivery of the child and the placenta. The infection shows itself about the fifth or sixth day postpartum, by rigors, a temperature of 103° F., and a severe abdominal angina. The fever is usually of short duration, and the further course of the disease is mild, but liable to become chronic. The cases in which the temperature begins to rise as early as the sixth day, and runs up to 103° F. or more, are not necessarily caused by a mixed infection, as Baum and others hold, but are due to the gonococcus alone. The diagnosis is based on the rather late onset, the slow, regular pulse, the moderate and steady elevation of temperature, the profuse purulent, glairy, discharge, and, above all, by the presence of the gonococcus in the lochia. The prophylaxis is of more benefit than treatment. All pregnant women having gonorrhea should be delivered without internal examination. Treatment should be limited to one or two intra-uterine douches, frequent vaginal irrigations and rest in bed for a prolonged period of time.

Accidental Perforation of the Uterus.—This accident is of far more frequent occurrence than is commonly believed, according to ABRAM BROTHERS (Am. Gyn., April, 1903). Cases occurring in the hands of midwives, professional abortionists and ignorant persons generally, in the effort to interrupt pregnancy, are frequently seen by physicians connected with public hospitals, consultants in gynecology, and the medical assistants of the coroner's office. But the large majority of cases which occur in the course of legitimate work and in the hands of honest practitioners of medicine never see the light of day because of the fear of criminal prosecution, or, at least, of public ridicule, even cases which do not go on to fatal termination. As a matter of course and fact, the author is convinced that it is the rare exception that uterine perforation ends fatally. In the treatment of these most unfortunate cases we must consider them in groups or sets. The first set of cases are those in which, during the passage of a sound or curette, the uterus is perforated. These cases will usually get well if manipulations are immediately brought to a close and if no irrigation is employed, intra-uterine in nature. If the uterus has been injured and the operator has irrigated the uterine interior, three sets of conditions may arise. In the first set a mild peritonitis (local) may call for nothing more than the same line of treatment. In the second set an acute septic peritonitis may call for an immediate hysterectomy (usually vaginal) with drainage per vaginam. The third set may be less virulent and more chronic. They are apt to terminate in localized abscesses which may be located in the pelvic tissues or in the pelvic

peritoneum. The operation in the majority of these cases will be in the nature of an exploratory laparotomy. In those cases in which the uterus has been injured and the intestine has been dragged through the wound, laparotomy must be done as early as possible. If the strangulation has been fatal to the vitality of the gut it must be excised at once. The uterus may then, according to the judgment of the operator, be repaired or removed. Miqual reports five such cases, which were not fatal. Hysterectomy and curettage should be less resorted to in the large proportion of these cases, and recovery will be increased in percentage ratio.

Vesicofixation of the Uterus.—Retrodisplacement without adhesions, persisting after earnest and careful treatment and producing symptoms such as backache, dragging sensations and neuralgia, increased by slight exertion, as walking, chronic constipation and intense dysmenorrhea, are, according to N. J. HAWLEY (Am. Gyn., May, 1903) best relieved by vesicofixation. The operation is not contraindicated by the presence of a hymen. It is far superior to the Alexander operation in that it allows inspection and thorough examination of the adnexa. Endometritis, which usually accompanies these cases or any other existing abnormalities of the external genitalia, can be treated and relieved at the same time, thus obviating a second operation or the inconvenience of changing position necessitated by abdominal section. The lessened danger to the patient, shorter time in bed and absence of visible scar should also be taken into consideration. After the patient has been carefully prepared for the operation in the usual manner, the following steps are to be taken in performing the vesicofixation. With the posterior retractor in place, the cervix is grasped in a double volsella and drawn down as far as possible and the uterine sound passed to note again the exact position. A tenaculum forceps or Senn's forceps now takes hold of the anterior wall in the median line and stretches it out and away from the cervix. The incision is started just below the forceps and 4 or 5 cm. away from the cervix, extending to the latter and down to the bladder-wall. The vaginal mucosa is now dissected back on both sides, a distance of 2 or 3 cm., and also separated from the bladder where it joins the uterus. This union is divided with the knife or scissors and the bladder quickly pushed off and away from the uterus with the finger or a sponge on a forceps. The hemorrhage ensuing is slight and easily arrested. When the peritoneum is reached it is better to continue the pushing and separate the peritoneum well back from the top of the bladder before opening it in front of the uterus. After opening this membrane transversely, the vesical portion is seized by forceps and held forward, while two fingers are introduced for exploration. A long Pean's retractor is now inserted anteriorly to press forward the bladder and peritoneum, the cervix is released and pushed upward while the body of the uterus is grasped with two-pronged tenaculum forceps as high as possible and drawn forward. Another pair of forceps are applied higher up, the first removed and this continued until the fundus uteri appears at the peritoneal opening. Upon pushing the fundus to the right, the left tube and ovary may be drawn down and inspected, and likewise the opposite side. With the fundus held firmly by the forceps and drawn down, the peritoneum from the bladder is brought back and over it as far as possible, where it is sutured between the tubes with a fine continuous chromicized catgut and any excess of peritoneum removed. The edge of the bladder, first separated from the uterus, is stitched high up on the anterior surface of the uterus and with a single chromicized mattress suture. The two edges of the vaginal

wound are now carefully approximated with interrupted catgut sutures, passed just deep enough to exclude hollow spaces. The bladder is catheterized and a loose vaginal packing of plain gauze is inserted. The object of the operation is to leave the uterus in an easy position of slight antversion, therefore care should be exercised not to suture the peritoneum too far back upon the uterus; likewise, vaginal fixation is not applicable to these cases unless after menopause, and should be resorted to only for complete prolapsus.

Puerperal Hematoma is of very rare occurrence and it would require the aggregation of several hundred cases of labor to arrive at the exact truth of its frequency, according to H. R. COSTON (Am. Jour. of Obstet., April, 1903). The predisposing cause is the engorged condition of the pudendal vessels and the strain put on them by labor; and to this may be added any pathologic condition of the vessels, such as sclerosis and varicosities. The exciting cause in most cases is the pressure of the fetal mass on the soft parts of the mother. The use of forceps or other instruments; symphyseotomy, or spontaneous separation at the symphysis pubis; the rapid delivery of the after-coming head; or the accidental striking of the parts against a hard substance. The vast majority of cases occur during labor, though it may take place after labor is terminated. When it is caused by injuries during labor, such as sneezing, violent coughing or the act of quickly sitting up in bed, has caused to dislodge a thrombus, and thus bleeding takes place. It may occur in any position, though usually it is in either of the labia majora. If the effusion occurs above the pelvic fascia it forces itself upward; if below the pelvic fascia it dissects toward the vulva. Pain may be more severe in a small hematoma that is stretching the skin, than in a large hematoma which is subperitoneal. If the amount of blood lost is great, there will be present, besides the signs of hemorrhage, pain proportionate to the amount of the hemorrhage and to the location of the blood. To the eye, the tumor is blue or bluish black in color, depending upon whether it is under the skin or mucosa. Should a hematoma rupture while the hemorrhage is in progress—especially if it should rupture intraperitoneally, all the symptoms of hemorrhage would rapidly increase, and unless the attendant quickly made use of radical measures, the patient would soon bleed to death. Should the hematoma become infected, there would be symptoms of suppuration added, with the production of metastatic abscesses. The condition of hematoma must be diagnosed from varicose veins in the vulva, hernia, inversion of the uterus, or vagina, blood clot, the placenta, or a fecal mass in the rectum. Formerly, hematoma was regarded as a very serious trouble, the death rate being from 20 to 40 per cent. In this day of asepsis it should not reach seven per cent. In all cases the bowels must be kept open; the diet must be light, but nutritious; the woman must have stimulants, tonics and alteratives as the case demands, always remembering to keep the stomach in a healthy condition. The skin and kidneys must be watched for septic processes. In failure of nutrition, in long continued cases, some preparation of malt or beer are to be recommended. Those cases occurring before delivery will receive the same treatment as those afterward, except that it may be necessary to incise the tumor to remove the obstructing mass.

Cystic Bladder Mistaken for an Ovarian Cyst.—With the diagnosis of an ovarian cyst, a colored woman, about forty years of age, was admitted to the wards of ENRIQUE FORTUNE (Am. Jour. of Obstet., April, 1903). There was a tumor of the abdominal cavity, cystic in character and about the size of a man's head.

There was bulging of the tumor in the lower abdominal segment, and it was centrally located. Its relations with the uterus could not be appreciated. It was somewhat movable. Diagnosis of ovarian cyst was made. There was repeated frequent micturition of small quantities, but the total amount excreted was normal. Operation was decided upon, and on opening the abdomen the cyst came into view and all efforts to withdraw it were ineffectual. Incision into the cyst brought forth a watery liquid. The internal surface of the cyst seemed so much like that of the bladder, that an assistant was instructed to catheterize the patient. A small amount of urine, bloody in character, and this with the fact that the catheter could be felt beneath the hands of the operator, assured him that the tumor was of the bladder. On a second catheterization of the bladder, the tip of the catheter was brought out of the abdominal wound. The lacerated portion of the vesical sac was resected with scissors and then sutured in two continuous planes. The abdominal wound was closed without drainage and a self-retaining catheter was introduced into the bladder and left there for nine days, after which time the urine was voided naturally and spontaneously. There was no urethral or vesical irritation. Convalescence was rapid. Inasmuch as the uterus was found to contain a large fibroma and hysterectomy was necessary, it was evident that the bladder was bent and compressed by the fibroma; the superior portion communicating with the inferior one, emptied itself incompletely until the time when the exaggerated flexion of the bladder shut it off entirely from the lower portion, thus establishing a permanent cyst. As the ureters voided into the lower portion of the bladder, no derangement took place other than the frequent micturition due to the reduced capacity of the bladder. The urine contained in the cyst lost its characteristics as a hydronephrosis, becoming watery.

PHYSIOLOGY.

The Irritability of the Brain during Anemia.—When the brain is subjected to anemia by the process of perfusing solutions, such as Ringer's solution, its functions soon cease, according to W. J. GIES (Amer. Jour. of Physiol., May 1, 1903). When anemia is induced rapidly, convulsions ensue. When gradually induced, anemia may be made acute without causing the appearance of convulsions. When anemia is produced gradually, the functions cease usually in the following order: (1) In cold-blooded animals: respiration, skin reflex, lid reflex, nose reflex, heart beat. (2) In warm-blooded animals: lid reflex, respiration, nose reflex, heart beat.

The Growth and Histogenesis of Nerves.—There are four stages in the development of nerves, according to C. R. BARDEEN (Am. Jour. of Anatomy, March 28, 1903). They are as follows: (1) The differentiation of motor nuclei and sensory ganglia. (2) The outgrowth from the central nervous system to various peripheral anlagen. (3) The development of branches from the principal nerves, etc., various parts differentiated from these anlagen. (4) The development of functional unity between the nerve fibers and the structures to which they are distributed. The proximal nerve plexuses are formed during the second period, the coarser peripheral plexuses during the third, and the finer peripheral plexuses during the fourth period. During the last three periods there may be considerable shifting in relative position of the structures to which the nerves are distributed. The union of nerve and muscle fibers takes place before the formation of the sarcolemma. The terminal apparatus of the nerve is more resistant to digestive fluids than the muscle substance, and is closely attached to the under surface of the sarco-

lemma. The sheaths of the nerves serve to maintain the stroma in which the axis cylinder fibrils grow. Myelinization is due to influences exerted by the axis cylinder fibrils on the surrounding stroma.

Oxalic Acid and Oxaluric Acid in the Urine.—There frequently occurs, according to A. M. LUZZATTO (Hoppe Seyler's Zeitsch. f. Physiol., Vol. 37, No. 3), in the urine of dogs and in small amounts in human urine, a substance which on boiling with hydrochloric acid, yields oxalic acid. This substance in all probability is oxaluric acid. The addition of ammonium oxalurate to human urines does not produce, even after a long interval, a sediment of calcium oxalate. This argues against the hypothesis that the occurrence of this sediment in urine depends upon the presence of oxaluric acid. Under certain, as yet unknown, conditions, less oxalic acid is found in urine boiled with hydrochloric acid than in unboiled urine, a circumstance of practical importance in the technic of the determination of oxalic acid. The administration of uric acid produces no noteworthy increase in the elimination of oxalic acid. One need not conclude, however, that oxalic acid is not formed in the organism out of uric acid, since it might be formed by the oxidation of the latter. Oxaluric acid is changed in the animal's body into oxalic acid and completely oxidized.

The Lecithanes and their Physiological Significance.—The group of bodies extracted from brain-substance, including lecithin, cephalin, myelin and others, and now classed under the name "phosphatids," should, according to W. KOCH (Hoppe Seyler's Zeitsch. f. Physiol., Feb. 5, 1903) be included under a general group which he calls "lecithanes." These are defined as waxy hygroscopic substances which are built up out of orthophosphoric acid, the higher satisfied and unsatisfied fatty acids, nitrogenous groups and glycerin. The author's investigations have led him to the conviction that the physical as well as the chemical properties of the lecithanes are of great significance for the life of the cells. The capacity of lecithin to mix with water, has been known for a long time. With water it forms a colloidal solution that cannot penetrate parchment paper. It is not precipitated by the univalent kations of Na, K, NH₄, Li and Ag, even in concentrated solution. The salts of the bivalent kations Mg, Ca, Si, Co, Ni, Fe²⁺, Zn, Cd, Cu and Pb produce a gelatinous precipitate. The salts of the trivalent kations act like those of the univalent; they are the salts of Fe³⁺, Al and Au. The anions Cl, Br, I, SO₄, Citrates, Oxalates and Ferrocyanides behave like the univalent kations. The non-electrolytes, albumins, peptones, glucose, urea alkaloids like caffeine, aconitin and strychnine and narcotics like urethan and chloral, have no effect on the solution. Chloroform is emulsified in the presence of the colloidal solution. Very remarkable is the influence of the univalent and trivalent kations upon the precipitation brought about by bivalent kations. In the presence of a slight excess of Ca, only a small amount of Na is necessary to inhibit the precipitation. All the above facts indicate that, as regards lecithin, it is not a question of chemical reactions but one of precipitation phenomena, probably of electrical nature. If the life of a cell depends, as Quincke and Loeb maintain, upon the condition of the colloids or their viscosity, it may then easily be seen how the antagonistic effect of the precipitate-forming calcium upon the dissolving sodium, would produce the correct viscosity necessary for a living cell. Too much sodium or too much calcium disturbs the equilibrium and the cell ceases to live, and the addition of the correct amount either of calcium or of sodium, renders possible the continuance of the life-process. The observations made by Mathews

on the effects of anions on motor nerves afford an inexplicable contradiction to the absence of any influence of anions on the solutions of lecithin. As regards the chemical properties of the lecithanes, one may look upon the constituent unsatisfied fatty acids and the nitrogenous group as those portions of the atomic complex that take part in the metabolism of the cell, the former being related to the oxidative processes. The nitrogenous group of lecithin is, according to Halliburton, of physiological significance, since, in certain diseases of the nervous system (e.g., paralysis) large quantities of cholin pass into the cerebrospinal fluid. The fact that cephalin unlike lecithin has one methyl group, indicates that the former is probably an intermediate metabolic product of the latter.

HISTOLOGY, PATHOLOGY AND BACTERIOLOGY.

The Medicolegal Tests of Blood Stains.—The identification of human blood stains has become one of the chief problems of forensic medicine. All differential methods are along two lines, tests based upon microscopic findings, and those based upon processes which may be based upon test tube reactions. Some further confirmatory experiments with the serum tests have been made by E. N. LAYTON (Am. Med., June 6, 1903). The serum was secured from rabbits. The author believes from his experiments, which cannot be detailed here, that the reaction observed is caused by the development within the blood serum of the injected animal of an antibody or a property or substance which causes a certain reaction with the serum homologous to the one injected. The reaction does not occur when normal rabbit serum is used. The reaction occurs much more rapidly, especially when dilute solutions are used, if the test is exposed to a temperature of 37°C., although it will occur at ordinary room temperature. Only the minutest stain and a single drop of the test serum is necessary for making the test, and its delicacy is not altered by the admixture of other bloods or of foreign material, except the albumin precipitates, nor by the age of the stain. A differentiation from monkey blood is possible by great dilution of the blood tested and a dilution of the test serum of 1:500, with incubation; also by a great dilution of the blood tested, the test serum being used pure at room temperature. The test is specific, invariable, and therefore applicable to forensic use. No difference could be detected in the reactions between the blood of white and colored persons.

Roaches as Conveyors of Typhoid.—A localized epidemic of typhoid fever in Chicago was believed to be due to the portage of infectious material by the ordinary cockroach, according to the statement of R. ENGELMANN (Medicine, June, 1903). Investigation of the large apartment house in which the epidemic occurred, showed certain apartments overrun with these vermin and here the cases of typhoid were found. When the roaches were completely exterminated no further cases developed. The author recommends in all cases that sulphur fumigation is indicated as supplementary to formalin disinfection.

The Bacillus of Typhoid in the Blood.—A series of blood cultures have been made upon typhoid fever patients to determine the relative frequency of the bacillus of that disease in the blood, by HERBERT FOX (Proc. Path. Soc., Phil., May, 1903). The blood was taken from undoubted cases from the median basilic vein by aspiration and mixed with agar-agar. In this way fourteen cases were examined and the results of the cultures showed the *Staphylococcus epidermidis albus* present in five cases, this and the *Staphylococcus pyog-*

enes albus in one, the *Bacillus typhosus* and the *Staphylococcus epidermidis albus* in one, the *Bacillus coli communis* in one, a spore growing bacillus, probably air contamination, in one, and absolutely sterile plates in four, save for mold. The culture which showed the *Bacillus typhosus* was made at the end of the second week and did not appear until four days after the plate was made. To the late day at which the cultures were made may be attributed the fact that the bacillus was not found more often. The frequency of the other forms must be attributed to the imperfect sterilization of the deeper layers of the skin.

The Effect of Small Amounts of Infectious Materials on the Blood.—The injection of a very minute quantity (1/300 part of a "loop") of a living twenty-four-hour typhoid culture into the veins of a rabbit was shown by F. FREYMUTH (Deut. med. Woch., No. 20, 1903) to exert a marked specific action on the blood. This shows how a very slight infection may have a most harmful influence on the blood-forming apparatus and may also explain how many chronic anemic conditions may depend for their continuance on a steady resorption of minute quantities of bacterial toxins.

THERAPEUTICS.

The Value of Theocin as a Diuretic.—This lately introduced diuretic remedy has been compared in a series of clinical tests with agurin, diuretin, and a number of other drugs, by H. KRAMER (Münch. med. Woch., March 31, 1903). The cases were all marked by ascites or general edema and the drug was given in five grain doses, three to five times daily. The effects were noticed quite soon after administration, from less than one to six hours. The maximum effect was observed on the first or second day of the administration, and as long as it was continued no diminution was seen of its effects. The blood pressure did not appear to be influenced in any way and no disturbances of the nervous system were observed. The only unpleasant after-effects were frequent nausea and vomiting. The author concludes that the remedy is a valuable and rapidly acting diuretic which rarely fails and is more powerful than either agurin or diuretin. It is desirable, however, to attempt the making of a preparation which shall be less productive of nausea and vomiting.

Potassium Iodide in Migraine.—The employment of this drug in many cases of so-called sick headache is highly recommended by J. R. CLEMENS (Therap. Gaz., May 15, 1903), who uses it to the exclusion of all other remedies. He was led to its administration by the observation that a great similarity existed between migraine and cerebral syphilis, the headache of both being characterized by pain that is deep-seated, constricted, of great intensity, with nocturnal exacerbations, long durations, and relapses. There is also present raised arterial tension. The author found that in the most aggravated cases, potassium iodide in 5 to 15 gr. doses, three times daily, diminished both the frequency and severity.

Value of Alcohol in Infections.—A preliminary note on some experiments to determine whether alcohol does good in infections by increasing the bacteriolytic power of the blood, is published by H. A. HARE (Therap. Gaz., May 15, 1903). The experiments were conducted in typhoid and also in a number of chronic cases, including nephritis, tubercular peritonitis, etc. It is apparent from the results obtained that the use of alcohol seems to have the power of combating infectious diseases by increasing the bacteria-destroying power of the blood. As far as they have gone, the experiments indicate that the effect is produced to some extent at least by an increase in the complement.

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SATURDAY, JULY 4, 1903.

A HOPEFUL OUTLOOK.

IT is with a feeling of enthusiasm that we present to our readers this week the paper by Dr. Maragliano, which has come to us fresh from the Congress at Madrid, and which gives us the result of his experiments in "The Struggle of the Body against Tuberculosis, and its Immunization."

As Jenner took the hint that led to vaccination as a means of immunization against smallpox, from a milkmaid who stoutly claimed that she could not take smallpox as she had already had cowpox, so Maragliano has developed the idea of an inoculation against tuberculosis from the well-known observation, as common and as simple as that of the milkmaid, viz., that many people, as is shown by autopsies and clinical histories, have tuberculosis, and get well of themselves, and never have a recurrence.

He holds and apparently proves that the human body contains within itself the power of exerting a potent counter-influence to the tubercle bacilli. The steps by which he proceeds in determining and intensifying this antitoxic element are ingenious, and marvelous in the exhaustive series of experiments by which he establishes a unit of test to determine exactly the effect of treatment on animals as well as on man.

When he declares that for eight years he has been able to effect a cure of tuberculous cases by means of the injection of the serum of immune animals, we are convinced of the genuineness of his clinical success. When he announces that he has at last succeeded in preparing a material which, all danger of infection being excluded, will cause, when inoculated under the skin, a tuberculous abscess, and which will render a man immune to tuberculosis, we echo his wish that there "may yet remain enough of life to him to see this conquest of science brought to an end."

Such men as Arloing, Behring, Koch, and notably Trudeau in our own country, have all contributed to the end which Prof. Maragliano believes that he has reached. If the salvation of humanity is at hand, no one is without honor, but after such earnest striving for such a glorious goal, we feel that Maragliano and his co-workers will win for themselves the satisfaction of having given hope to the race.

THE TUBERCLE BACILLUS AND NUTRIMENT.

NEARLY ten years ago Dr. E. A. de Schweinitz in the course of investigations undertaken in connection with his work as government expert at Washington, pointed out that the bodies of tubercle bacilli are rich in substances of a fatty or waxy character which can be extracted when collected in sufficient quantities by means of ether and alcohol. His work was carried on in connection with Dr. Dorset and was published in the *Journal of the American Chemical Society*, August, 1895. The conclusions reached were confirmed by Behring and others in Europe, who showed that the greater part of the bodies of tubercle bacilli, when obtained in large quantities in bouillon for the special purpose of analysis is composed of this fatty or waxy material. These investigations referred only to tubercle bacilli of human origin, but seemed to point out that only conditions in which the tubercle bacilli could obtain fatty material for its nutrition readily would make a suitable environment for the rapid growth of the bacilli.

We pointed out some years ago that these observations seemed to furnish an explanation of two facts that had been noted clinically for many years, but of which no complete explanation on clinical grounds was forthcoming. It is in persons who are under weight as is evident by clinical experience and by the attitude of insurance companies toward those who are below the normal weight and in individuals who are rapidly losing

weight that the tubercle bacillus grows with special luxuriance. On the other hand it is well known that as soon as patients begin to gain in weight the previous growth and tendency to dissemination of the tubercle bacilli in their tissues comes to a halt. In a word, there is a distinct connection between the condition of the fat contents of the patient's tissues and the tendency to tuberculosis.

When patients are losing weight, fatty material is being taken up from portions of the body where it was previously deposited and is finding its way through the lymph channels into the veins in order to be used up on the arterial side of the circulation in the presence of the oxygen from the lungs, for it is by oxidation processes that fat is burned in the body. When the fat thus being carried in the venous blood is on its way through the lungs, it evidently furnishes a plentiful supply of fatty material for the growth of the tubercle bacilli that may be present. Unless the tubercle bacillus can obtain this fatty material thus abundantly it cannot grow luxuriantly. On the other hand, when fatty material is being deposited in the body tissues, there is an absence of fat products of suitable nature for the nutrition of the tubercle bacilli in the venous blood that passes through the lungs and consequently a condition develops unfavorable to the further growth of tubercle bacilli.

Since his original observations on the composition of tubercle bacilli, Dr. de Schweinitz has made a similar set of analyses upon tubercle bacilli derived from swine, the horse, the bird, cattle and various attenuated and virulent forms of human tubercle bacilli.

While there is considerable difference in the amount of soluble matter in these various germs, there is enough of similarity to indicate that they belong to the same family. The differences that exist, however, are suggestive, inasmuch as the virulent human germ appears to be more closely related in its composition to the bacillus of bovine tuberculosis than to any other, just as the attenuated human germ appears to be more closely related to the avian bacillus of tuberculosis, which is, so it is thought, not pathogenic for man, though it can be made pathogenic by Nocard's method of growing it for a while in collodion sacs in the peritoneal cavity of certain susceptible animals.

In his article, read before the Climatological Association, last year, Dr. de Schweinitz suggests (Transactions of the American Climatological Association, Vol. 18, 1902) that the com-

position of these various germs is instructive in showing us that the bacilli utilized those constituents of the animal body, which are very important for life and health. He adds that it is not unreasonable to believe that this unnatural waste could be offset by food which would supply the material especially desired by the bacteria, so that the natural processes of life should be balanced and the organism able to protect itself from the attacks of disease producing bacteria. The hitherto empirical use of fats in the treatment of consumption is thus given an experimental explanation. Nuclein and lecithin, which have also been suggested on theoretical grounds apart from the composition of the tubercle bacilli, would also seem to be indicated in order to make up for the increased consumption of these substances due to the growth of the tubercle. This method of dietetic treatment would as can be seen constitute a direct antidote to the specific "consumption" of material that causes the general breakdown, and hence has caused the disease to be called, so appropriately, phthisis or consumption.

Since the tubercle bacilli are on varying culture media susceptible of great changes, not only morphologically, but in their specific virulence, which is in direct ratio with the favorableness of their surroundings, diet may actually modify the character of the tuberculosis in a given case and make it more tractable. This bacteriological substantiation of the old dietetic treatment will encourage still more the ever growing number of those who, in recent years, have been practically abandoning drugs and especially all notion of specific indication to insist upon fresh air and food as the only real remedies for tuberculosis.

FOURTH OF JULY TETANUS.

THE present issue of the MEDICAL NEWS bears the date July 4, and although we feel that the subject is hackneyed, yet the crop of deaths which signalizes our inevitably recurring annual epidemic of tetanus, as a consequence of the celebration of the Glorious Fourth, should not be allowed to pass without a word. Already the Board of Health of Chicago has reported a series of deaths from tetanus occurring in wounds caused by fireworks, or firearms, bought in anticipation of the noisy celebration.

We cannot hope that good sense is to prevail in this matter and so physicians must be especially mindful of every possible prophylactic precaution in the treatment of wounds that come under observation about this time and likely to be

contaminated with street dirt. As pointed out by the municipal health authorities of Chicago, a number of patients who have died have been treated by physicians from the beginning, and, sad to relate, have not all been treated by such methods as are best calculated to minimize the danger of tetanus infection.

It is now too well known by physicians to need repetition that the tetanus bacillus is absolutely anaerobic and will not grow in the presence of the free oxygen of the air.

It is almost as constantly present in street dirt, contaminated as that always is by horse droppings as it is in the dirt of farm yards, which seems to be its usual habitat outside animal bodies. Tetanus would be much more frequent, only for the fact that in open wounds the bacillus will not grow. In the seared wounds made by the burns of fireworks, toy pistols or the like, if the tetanus bacillus gains an entrance it is likely to be placed under favorable conditions for growth, because of the rapid sealing process on nature's part that follows in the attempt at repair of a burn.

The physician's duty in the matter, then, is to lay such wounds open if necessary and keep them open as far as possible rather than to encourage rapid healing. Many other therapeutic measures have been suggested but few have proved worthy of confidence. Cauterization instead of acting as a prophylactic would probably add to the danger by causing superficial coagulation necrosis of tissues beneath which the tetanus bacillus finds a favorable culture medium away from the oxygen of the air. Antitetanic serum has lost the confidence of the profession, at least when used in the later stages of the disease. After all it is not surprising that tetanus antitoxin should prove a failure, since the first manifest symptoms of tetanus are, as has been well said, not the preliminary signs of the disease, but the first warning of fatal intoxication from tetanus. The toxins of this fatal affection have already become inextricably associated with the nerve cells of the patient and there is little hope for relief.

There still remains the possibility of antitetanic serum proving useful if administered shortly after the infliction of the wound. In this case any tetanus toxin present is neutralized and a condition of the fluids of the body set up which is unsuitable for the growth of the tetanus bacillus. Prophylaxis must be a watchword and this can be best accomplished by encouraging free

bleeding and preventing, as far as possible, any precocious closure of wounds that have been contaminated by street dirt. The precautions are worthy of careful attention since, according to recent statistics, tetanus has been calculated to carry off each year about 30 to 40 per million of the population of large cities.

WHO IS RESPONSIBLE?

GOVERNOR ODELL very naively remarks in a recent contribution to the daily press, that "in a recent visit to the institutions there was not disclosed the horrible state of affairs which has been set forth by some sensational writers in the public press," and adds, "it may be that the true situation of affairs was so concealed from him that he was unable to discern it." Perhaps the Governor inspected the Randall's Island Institution for Juvenile Delinquents in much the same manner in which he made an inspection of the State Hospital sometime in the past year—the results of which were embodied in one of his messages to the legislature.

We can well imagine the Governor did not see anything out of order at Randall's Island when his strabismic report on the conditions in the State hospitals is borne in mind, in fact, myopia seems to be the Governor's chief stock in trade in this particular phase of his duties. It is all very well to attempt to saddle the responsibility of the conditions on Randall's Island on President Orr's shoulders, but unless it can be shown that a comprehensive and thorough knowledge of the State charitable institutions is possessed by our chief magistrate, we cannot feel that the taxpayers of the State believe that the interests of its charges are being looked after, from the true philanthropist standpoint rather than from the viewpoint of political graft.

ECHOES AND NEWS.

NEW YORK.

New Regulation at Post-Graduate School.—According to the annual announcement of the Post-Graduate Medical School, 639 physicians from various parts of the United States and Canada have attended the institution during the past season. The Faculty has instituted a new system, by which certificates of proficiency will be given to such doctors as attend the clinics for six months continuously and who pass a satisfactory examination on any one subject.

Treatment of Dysentery.—The forthcoming bulletin of the State Health Department will make the announcement that the State antitoxin laboratory will co-operate with the Rockefeller Institute this summer in a careful investigation into the treatment of dysentery. Local health officers called upon to handle an epidemic

of the disease this year are to be asked to notify the State Health Department in order that it may be investigated. The bulletin also will deal with the use of the tetanus antitoxin, which the department is prepared to furnish to health officers.

Epidemic of Trachoma at Buffalo.—Advices from Buffalo, bearing date of June 24, state that trachoma is becoming more and more prevalent in that city. According to the statement of an official of the United States Marine Hospital, more than 100 cases of the disease have been found among the employees of the Lackawanna Steel and Iron Company, and many have been treated by physicians in almost every section of the city. It is believed that the disease was brought by foreigners, who came into the country by way of Canada.

Roosevelt Hospital Busy.—The annual report of Roosevelt Hospital, which has just been made public, shows that the number of patients under treatment in the year 1902—3,874—was greater by 104 than in the preceding year, and the daily average of patients larger by 12 than in 1901. The number of cases treated in the emergency department was 8,339, or 281 in advance of any highest previous record. The report indicates that the two automobile ambulances in use by the hospital have proved to be somewhat unsatisfactory because they have become disabled so frequently. The remodelling of the ambulances is recommended. The record in the "out-patient" department shows an increase of treatments, which is considered an encouraging sign in view of the falling off in many of the dispensaries. The gifts in money to the hospital were few, the total amounting to only \$5,113.31, while the expenses for the year were \$172,593.62—\$13,928.32 greater than in the previous year. The report calls attention to the urgent need of increasing the endowment fund by \$500,000. Not a single bed was endowed during 1902, and that the annual deficit was kept down to \$6,208.23 was due to the increase in patronage of the private patients' pavilion.

Sale of Antitoxin by Health Board.—Dr. E. J. Lederle, President of the Board of Health, sent to the Mayor last week a letter replying to a communication from Mr. Low regarding the manufacture and sale of antitoxin by the Department of Health. In this letter Dr. Lederle says that the production by the department of diphtheria antitoxin was begun, and arrangements subsequently made, so that physicians might obtain their supplies properly, and also so that in cases where the family of a patient was too poor to pay for the antitoxin, it should be given free by the Health Department. Some time after this went into effect, Dr. Lederle writes, a provision was inserted in the charter permitting the department to sell its surplus supply. Accordingly the department sold large quantities to persons outside of the city as well as inside its boundaries. This sale was due to the confidence felt in the purity of the antitoxin produced by the New York City Health Department. According to Dr. Lederle now, however, it is the expert opinion that there are other products of antitoxin on the market which are of as high grade as that prepared by the Health Department. Believing that the sale of antitoxin by the department to persons outside the city is contrary to the spirit of the charter, the doctor says he has informed such persons they must arrange to make their purchases of other producers after July 1. He goes a step further and suggests that hereafter the department shall dispense all its laboratory products free, as do other municipal and State laboratories upon receiving the proper requisitions from department officers or private physicians. Such distribution would, of course, be confined to residents of the city who may be in need of these products as a prevent-

tion of or cure for contagious diseases. Should this plan be adopted, and should the department at the same time stop its cash sales, between \$20,000 and \$25,000 annually will have to be supplied by the Board of Estimate in addition to the appropriation now current, of \$49,748 for the maintenance of the laboratories. Mayor Low said he would submit the suggestions of Dr. Lederle to the Board of Estimate.

A Righteous Decision.—The Corporation Counsel's assistant, Matthew C. Fleming, brought suit in behalf of the Tenement House Commission against Katie Moeschen, the owner of the property, No. 332 East Thirty-ninth street, for a penalty for failure to comply with section 100 of the amended tenement house law relative to sinks in yards of premises occupied by more than three families. Associated with the defendant were the United Real Estate Owners' Associations, composed of more than seven thousand property owners. They set up as a defense that the law ordering extensive improvements and exposed plumbing was unconstitutional, because it was unreasonable, arbitrary, improper and unfair, while admitting that section 100 had been violated. After a trial lasting two days, in which much testimony was taken, the case was decided in favor of the department. It was a surprise, as the defendant had demanded a jury trial, and on the jury were a prominent builder, an iron merchant, a plumber and several owners of tenement houses. But after a three hours' discussion the jury brought in a verdict against the defendant. Having obtained a verdict of a jury that in their opinion the law requiring the removal of alleged unsanitary structures from the yards of tenement property is reasonable, the Corporation Counsel and the Tenement House Commission feel that their position is morally and legally much stronger than before, and they are ready to meet the appeal taken by Philip Bloch, the Real Estate Owners' Association's counsel. Experts testified that the unsanitary condition of structures facilitated the transmission of typhoid, diphtheria, cholera and tuberculosis. Plumbers and builders testified that to make the alterations demanded under the terms of the amended law would mean an expense of \$750 and upward in nearly ten thousand cases. As the law applies to all structures in this city occupied by more than three families whose cooking is done separately, this decision concerns the owners of many apartment houses where the rents run from \$30 to \$40 a month, quite as much as it does the owners of tenements. Probably another case will be tried very soon in the Court of Special Sessions, according to Mr. Fleming, and whichever side wins the matter will be carried to the Appellate Division of the Supreme Court in order to get a decision at the October term. This will bring the adjudication of the matter close to the municipal election, and both sides feel that political capital will be made out of the affair.

Manhattan Dermatological Society.—A regular monthly meeting was held June 5, 1903, Dr. L. Weiss, presiding.

The following four cases were presented by Dr. W. S. Gottheil: (1) Lupus vulgaris; present since childhood; (2) Lupus erythematous of five years' duration. Both cases subjected to Finsen therapy three times weekly for the past 2½ months, and both showing decided improvement. Dr. Cocks stated that Finsen therapy was of undoubted benefit in lupus vulgaris; in lupus erythematous it was not so good a therapeutic test, since equally good results might be obtained with other methods; (3) a case of eczema seborrhoicum; patches of varying size, scaly, moist and friable, covered the entire body; under treatment the condition is improving; the case was considered typical; (4) congenital tertiary syphilis in a boy of eighteen years;

eruption of tuberculous and rupial patches were present for the past four years; no history of infection obtainable; hearing and sight are good; the right tibia shows "saw bone" contour. This case was regarded as specific, but the majority of the members believed it to be acquired rather than congenital.

Dr. L. Weiss presented a woman of fifty years, showing an irregular outlined ulceration at inner angle of left eye and adjacent nose and cheek; present about two months and of rather rapid development. Many years ago patient states she had an extensive ulceration along the right postauricular and occipital regions, which healed, and now shows in this region white, glistening, pearly scar tissue. Patient denies any infection. Believing it might be an acute outbreak of lupus, patient was treated accordingly with negative results. Under ung. hydrarg. ammonium, the ulceration is rapidly healing and to this circumstance Dr. Weiss now suspects a syphilitic taint. Dr. Gottheil said that the old scars on neck look like old luetic lesions; the acute process was too rapid in its course and unlike lupus in this respect. Dr. Oberndorfer considers it a superficial gumma; he also looks upon the old scars as specific. Dr. Kinch said rapid growth and tendency to get well under treatment mentioned favored diagnosis of lues.

Dr. B. F. Ochs presented a case with the following history: A young man applied a bandage saturated with carbolic acid (3*i* to 5*viii*) to both arms to relieve an acute hyperemia and itching; some pain followed and the bandages were removed within one hour, and soothing applications applied; though the pain was relieved, some soreness still remained and within twenty-four hours a ridge of blisters was observed encircling both arms and corresponding to the upper and lower limits of the bandages; from these there developed a circle of keloid; on the left arm the circle of keloid was complete; the right arm partially so and the circle completed by a ring of pigmentation. The phenomenon was unusual and could not be satisfactorily explained by Dr. Ochs. Dr. Weiss expressed the opinion that the carbolic solution plus a tight bandage might account for the development of keloid. Dr. Gottheil remarked that so weak a solution of carbolic could not produce sufficient loss of tissue and consequent keloid. Dr. Abrahams said he saw a great deal of harm result from even weak carbolic acid solutions; if patient was susceptible, loss of tissue may have taken place; the keloid could then be accounted for.

Dr. Ochs also presented (on account of its rare situation) a case of verruca, situated on buccal mucous membranes and at angle of lips.

The following cases were presented by Dr. R. Abrahams: (1) A case which he termed morphea; a circumscribed patch of scleroderma on left cheek, showing beginning atrophy at its outer edge.

Drs. Gottheil and Pisko could not recognize any scleroderma nor atrophy; they regard it as a simple edema. Dr. Oberndorfer believed it to be edema, probably due to involvement of the nerve filaments of the infra-orbital branch. Drs. Bleiman and Sobel termed it angioneurotic edema. Dr. Abrahams said the latter would not last for eleven years, coming and going; he recognized a resemblance to a variety of morphea described by Crocker. (2) Case of idiopathic atrophy of skin confined to right foot. It began as a patch of redness which faded away, leaving a patch of pigmentation; the process repeated itself until the dorsum of foot became involved; there is some thinning of the skin and pigmentation. It was believed by the members that the process was an eczematous condition, pigmentation being secondary; the appreciable thinning of the skin was not considered a true atrophy. Some varicose

veins were observed, which were regarded by Dr. Oberndorfer responsible for the extensive and unusual pigmentation.

Dr. I. P. Oberndorfer showed a case of lichen planus obtusus, lesions confined to the right lower leg. (2) A case with the following history: Male, forty years old, was operated upon nine months ago for a right sciatica, since which time the right leg is anesthetic. About four weeks ago there appeared on the right foot an eruption characterized by central excoriation peripheral vesicles and bullae with undermining of the cutis; process extended until entire sole and inner side of foot were involved; the loose cuticle being removed reveals a highly red inflammatory zone, dry and apparently in the process of healing. Dr. Oberndorfer believes in some connection with the nerve lesion mentioned and terms the condition trophaneurotic dermatitis. The majority of the members looked upon it as a traumatic dermatitis and probably independent of the pre-existing nerve lesion.

A third case by Dr. Oberndorfer was a typical case of scleroderma; process began three years ago in the left hand; then the right hand, face and both feet in the order named; the fingers show clubbing and the nails atrophy. The parts are hard, tense and thickened. On thyroid extract recently, and patient shows some improvement.

The Work of the Milk Commission of the Medical Society of the County of New York.—The warm season is at hand when food is preserved with difficulty, and when deaths from summer diarrhea in infancy become numerous. Since many of these deaths are due to unwholesome milk, which is produced in dirty dairies, is never efficiently cooled and is very old when delivered to the consumer, such milk, on account of chemical changes and its myriads of bacteria, being unfit for infant feeding, the Milk Commission of the Medical Society of the County of New York would call attention to the inspected and certified milk produced under its supervision, the general use of which should tend to diminish materially this great factor in our death rate. The inspected milk is produced at dairies which are inspected at regular intervals by the inspector of the Commission. The stables are clean and are provided with facilities for cleansing the hands of the milkmen. The water supply, the milkers, the utensils, the cattle and the transportation are all subject to requirements necessary for producing a clean and safe milk. This inspected milk may be bought in bulk for institutions or in bottles for families at or about the same price as ordinary milk. Each bottle is covered by a cap marked "Inspected by the Milk Commission of the Medical Society of the County of New York." Certified Milk is a still higher grade of milk produced under very stringent rules. Thus, among other things, it is required that the dairies producing this milk should sterilize all bottles and other utensils and seal and date every bottle of certified milk. Certified milk is sold at a somewhat higher price than inspected milk.

Inspected milk is supplied by L. L. Campbell & Brother, 2288 Broadway; Locust Farms Company, 812 Sixth avenue; Meadow Brook Dairy Co., 984 Fulton street, Brooklyn.

Certified milk is supplied by Briarcliff Farms, 573 Madison avenue; Brookside Dairy Farm, Newburg, N. Y.; Hyde Park Milk Co., 587 Madison avenue; Locust Farms Milk Co., 812 Sixth avenue; Meadow Brook Dairy Co., 984 Fulton street, Brooklyn; Sheffield Farms (Slawson, Decker & Co.), Offices of Sheffield Farms; Slawson Brothers and T. W. Decker & Sons; Sugar Loaf Dairy Co., 530 West Twenty-second street; Thorndale Farms Co., 901 Sixth avenue.

PHILADELPHIA.

The Phipps Institute and Its Progress.—The Phipps Institute was established by Mr. Phipps for the Study, Treatment and Prevention of Tuberculosis. Temporary quarters have been taken in a large building well adapted to hospital purposes and near the over-crowded tenement district. The dispensary was opened on Feb. 1, 1903. Within the past month three wards (two for men and one for women) of 16 beds each have been opened for the care of cases in the last stages of the disease. There is no restriction to admission with the exception of a certificate, signed by a member of the applicant's family permitting an autopsy in case of death. As the Institute has for one of its principal objects the *study* of tuberculosis, this is a matter of importance. In but very few instances has this permission been refused.

An emergency ward of four beds has also been provided for those of the dispensary cases suffering from hemorrhages or pleural effusions needing immediate attention. In addition to the three large wards there are ample facilities for the dispensaries, laboratory and post-mortem room.

To date there have been treated in the dispensary 1,167 cases; of this number at least 200 are non-tuberculous. Many of them coming to the institution for an opinion. It is surprising the widespread interest that is being displayed as to the danger of the disease. A complete history and physical examination is made of each case and exact instructions given as to how they shall take care of themselves and avoid transmitting the disease to others. Each case is provided with a paper spit-box, paper napkins and a paper bag for disposing of the soiled napkins. The bag and its contents are destroyed by fire each day. The advantages of sleeping in a well-aired room, keeping in the open air during the day and avoiding exercise are also explained.

The city has been divided into districts for the distribution of milk, which is given free to those unable to pay. This practically includes every one with the exception of those living in parts of the city inaccessible to the milk man. It might be added that no case in a position to pay a reasonable fee to a physician is treated. Information on this point is obtained from the applicant: (1) wages, if working; (2) sick benefits, and (3) expenses for living. It is a simple solution of the dispensary abuses and thus far seems most successful.

Following the scheme devised by Calmette, of Lille, a large map of the city has been provided and by means of pins with colored heads the situation of each case of tuberculosis is indicated. The different colors indicate the amount of milk (1, 2, 3, or 4 quarts) received; also whether the milk has been stopped or the case receives no aid. One of the great difficulties has been to keep a proper watch over the cases and see whether the instructions were carried out. This has been overcome by the appointment of inspectors whose duty it is to visit the houses from time to time and see that the applicants live up to the rules. It is the intention to appoint as inspectors cured or arrested cases from the Whitehaven Sanatorium. This will provide them with employment and having been thoroughly schooled in the treatment, make them competent judges. Of course it is entirely too early to form any conclusions but it can be definitely stated that a large proportion of the cases have shown a slight but consistent gain in weight. The milk which is the best quality obtainable may have some bearing on the question of weight.

State Board of Medical Examiners.—The mid-summer meeting of the Pennsylvania State Board of Medical Examiners was held during the week beginning June 23. In Philadelphia, 246 candidates were examined and 145 in Pittsburgh. President Beates

stated that the standard had been considerably raised from that of previous years.

Improvement Needed at Municipal Hospital.—As a result of an inspection of the Municipal Hospital, Director Martin has stated that the conditions there are not what persons who are forced to go to the institution should rightly expect. It is stated that more rigid attention should be given to the disinfection of nurses and attendants who are constantly leaving and entering the hospital. The arrangements for the disposal of infected material and refuse are inadequate. A crematory should be erected on the ground in order that this material can be destroyed instead of entering into the sewers. The place is infested with rats, which may be a medium of spreading the diseases under treatment at the hospital.

Additional Filter Placed in Operation.—The Upper Roxborough filter plant was placed in operation June 26. With the aid of the Lower Roxborough plant, which was completed several months ago, that portion of the city included in Germantown, Chestnut Hill, Mount Airy, Roxborough, Manayunk and the section lying north of Allegheny avenue, between Broad and Sixth street, will now be supplied with filtered water. The lower plant is now filtering 8,000,000 gallons of water a day. The Upper plant will filter 18,000,000 a day, though at present it is limited to 8,000,000, in order to allow the beds to ripen. The wards now supplied are the Twenty-first, Twenty-second, Thirty-third, and Thirty-seventh. The three latter are at present the center of contagious diseases in the city, and the use of filtered water is expected to bring about a decided change in these conditions.

Pasteurized Milk Plant to be Installed.—Nathan Straus, of New York City, has given to Philadelphia a complete Pasteurizing plant, to provide modified milk for the children of the poor of this city. The work is to be carried on by contributions of the people. The old police station at Fifteenth and Filbert streets is being prepared as a site for the plant. The Children's Aid Society has offered a suitable room in its building as a distributing center. The formulae of milk preparations will be under the supervision of the Philadelphia Pediatric Society.

Herb Doctor Convicted.—George P. Hossey, the negro herb doctor who has been on trial for a week, charged with complicity in the murder of William G. Danze, was convicted June 26 of murder in the first degree. The jury was out a little over an hour. Danze died two years ago and the attending physician made out a certificate giving heart disease as the cause of death. The police became suspicious and after a careful investigation Danze's widow and Hossey were arrested. Danze's body was exhumed and arsenic was found in the stomach. It was later discovered that Hossey sold the arsenic to Mrs. Danze, with which, it is alleged, she ended her husband's life. She will be tried in the fall. It is charged that Hossey has been implicated in at least twenty murders.

CHICAGO.

Urges Emergency Hospitals.—County Commissioner Wm. H. Thompson has advocated the erection of three emergency hospitals in the poor districts as adjuncts to the County Hospital, that accidents and emergency cases may receive quicker service. At a meeting of the building committee, he said that many lives might be saved if the patient received care more promptly. Other members of the committee favored such hospitals, if the County Board can get the money with which to build them.

Plan for a Home for Consumptives.—Plans were discussed by the county commissioners for the removal

of the consumptives from the county institutions at Dunning, and the building of a new hospital for their care under the most modern methods, at some spot among the highlands in a more remote portion of Cook County. The Commissioners propose to get the \$100,000 or more, which the new colony for consumptives would cost, from the proceeds of the \$1,250,000 bond issue which was voted by the county at the recent judiciary election.

Death of Dr. N. H. Henderson.—Blood poisoning, resulting from an operation for the relief of a dying patient, brought to an end the career of Dr. Neilson H. Henderson, executive head of Lakeside Hospital, of this city. An unnoticeable defect in the rubber gloves used during an operation, and a slight abrasion of the finger, due to a small hangnail, were the contributing causes.

Preliminary Report of the Milk Committee of the Chicago Medical Society.—At the last meeting of the Council of the Chicago Medical Society, a committee was appointed to consider the milk supply of the city of Chicago, and was empowered to take such steps as they might consider advisable, with a view of improving the quality of the milk brought into Chicago. It was suggested that the committee act for the Chicago Medical Society in disseminating such information among the profession and the public that might bring about a demand for high grade milk. There are about 628,000 quarts, or 19,600 cans of 8 gallons each of milk supplied to Chicago daily, a per capita quantity of approximately two-thirds pint. To produce this amount of milk, some 50,000 cows are required, on some 5,000 to 6,000 dairy farms. These farms are located in Illinois, Wisconsin, or Michigan, within a radius of 150 miles. Milk as presented to the consumer may be classified, depending on its manner of production, method of handling and quality, as: (a) Bulk milk and cream complying with the city ordinance as to quality, equaling three per cent. fat and twelve per cent. total solids for milk, with twelve per cent. fat for cream; (b) skimmed milk, marked by a tag bearing the words "skimmed milk," that is attached to the shipping cans and the pouring cans; (c) bulk milk that has been bottled in the city; (d) bottled milk, the bottling having been done at the stations in the country; (e) high-grade milk ("certified"), produced under the most approved dairy methods. Bulk milk and city bottled milk comes from the country on the regular milk trains. It is usually mixed night and morning milk, and leaves the dairy between four and seven o'clock in the morning, and arrives at the various railway milk platforms between 9.30 and 10.30 A.M. The cans are then taken to the city dealer's depot and kept cool until the following morning. Some of it, meantime, is placed in bottles, and is delivered to the consumer twenty-four to thirty-six hours from the time of milking. The milk bottled in the country is about the same age when delivered, but it remains on ice in the country during the day, and is brought into the city during the night. Practically all the bottles are packed in cases that are iced, and they remain iced from the time they are bottled until they reach the consumer. At the present time the chemical quality of the city's milk supply is under control of the Department of Health. By persistent vigilance, a good quality, from the chemical standpoint, is easily maintained. Only one sample is now found below grade to the 10 to 15 found below grade at the beginning of this inspection, ten years ago. Bulk milk will vary most in quality because of irregular mixing. Bottled milk is quite uniform, because a large volume is mixed and filled quickly into bottles. Few persons know of the skimmed milk tag, and many, therefore, get low-grade milk, while the dealer is pro-

tected against prosecution. Every housewife has the right to see if there is a tag on the can or not. Today, coloring matters or preservatives rarely are found in the milk. What is especially lacking is sanitary control of the dairy, and this is very difficult, if not impossible, in certain directions. We can only force the farmer to change his uncleanly methods by a slow, laborious education of the public to purchase only such milk as has been obtained under the most approved sanitary methods. The bacteriology of milk is the index of its sanitary condition. The bacteria commonly present are derived in small number from the cow, and in great numbers from extraneous sources. Bulk milk and milk bottled in the city contain the largest number of bacteria, while "certified" milk contains the least number. The number of bacteria in milk can be kept to the minimum by clean milking, quickly cooling, and maintaining a low temperature until consumed. The dairy men are directly responsible for dirty milk. The conditions under which milk is placed in the first few hours after it is drawn determine whether it will be pure or not. During the summer months it is most difficult to maintain the necessary low temperature. The average farmer has no ice, and the ordinary milk train is not a refrigerator car. Bulk milk is presented to the consumer usually just before it sours. Such milk, when bottled in the city, gives a false security, as the consumer believes it has been bottled in the country. Milk produced under fair conditions, bottled and iced in the country, and transported in refrigerator cars, as most bottled in the country milk is, makes a good supply for general use. It is preserved from dirt, it is manipulated less, and cooled at a time when the cooling has the greatest value.

For infant feeding and for the sick, the highest quality of milk should be obtained. Certified milk is produced in a small way only because the demand for it is not large, and did the profession take the interest in the subject that they should, there would be such an increased demand for pure milk that would encourage its more general production. In the feeding of babies, no compromise in the quality of milk can be tolerated. It must be the best milk that we give to the babies, if we would reduce the enormous infant morbidity and mortality that prevail in urban centers.

Instructions for the Home Care of Milk.—No milk should be accepted unless bottled and sealed, and delivered from wagons with coolers. The bottle should be taken from the hand of the deliverer (not be left to stand in doorways and halls) and placed immediately upon ice. In the absence of ice, the cold bottle should be wrapped loosely in paper, old newspapers, and kept in the coolest corner. Never put the cold bottle under the faucet, as ample paper wrapping will, if dry, keep out the heat for many hours. Never remove more milk or cream from the bottle than is needed for immediate use, replacing the cover at once. The cover should be handled with a clean fork. If cream is needed, remove carefully by pouring from the top layer. If whole milk, shake the bottle before unsealing. If properly stoppered, it can be inverted repeatedly till thoroughly mixed. When small quantities of milk or cream are needed at short intervals, it is better to order two or more small bottles than one large one, allowing the reserve supply to stand wrapped, sealed and undisturbed. It should be borne in mind that every contact of the milk with cups, spoons, feeders, or even the air, increases the danger of contamination by germs, from which no household is free. Keeping the milk cold is the best means of retarding chemic and putrefactive changes from germs already in the milk. Never pour milk back into the bottle. Flies are the most industrious infection carriers, so that the exposed rim of

the bottle, the stopper and all cups and spoons must be carefully protected from these pests. Visible dirt rarely poisons. It is the unseen germs of disease that may be destroyed only by the free use of soap and frequent boiling of all kitchen and table utensils. Under some conditions milk may be scalded (Pasteurized), or boiled (sterilized), to destroy the germs it contains, and this may be advisable when the milk supply is not above suspicion, but it should be remembered that boiling impairs the food value and also renders the milk less digestible. It does not rejuvenate old milk, but merely makes it "keep" better by destroying ferments which cause putrefactive changes. The committee would suggest that every member of the Chicago Medical Society investigate the milk supply of his patients. No bulk milk or milk bottled in the city, should be used under any circumstances. Milk bottled in the country, cooled and kept on ice, can be obtained from a number of milk dealers, and should be the only milk used for general consumption. Certified milk only should be used in the artificial feeding of infants. The committee would also suggest that a permanent milk commission should be organized by the Society to undertake a pure milk crusade, and certify to the grading of all milks delivered in Chicago.

Endow Medical Paper.—The *Journal of Infectious Diseases*, a new magazine to be established at the University of Chicago, has been endowed by Mr. and Mrs. Arnold F. McCormick, the parents of "Little Jack," John D. Rockefeller's favorite grandson, whose death from scarlet fever three years ago inspired the establishment of the Rockefeller Institute for Medical Research. It is believed that the eventual endowment fund will be about \$125,000. Dr. Ludvig Hektoen, head of the department of pathology and bacteriology at the university, and Dr. Edwin O. Jordan, associate professor of bacteriology, are to be the editors. The first number will appear from the University of Chicago press on January 1.

CANADA.

Ontario Medical Association.—The twenty-third annual meeting of the Ontario Medical Association was held in Toronto on June 16 to 18, under the Presidency of Dr. J. C. Mitchell of that city; Dr. Harold C. Parsons of the same city performing the duties of secretary. It was a three days' meeting, the first time that the Association had ever held a meeting longer than two days, and the success which attended the venture was more than satisfactory to the officers in charge. Dr. J. H. Musser, of Philadelphia, was present and delivered a highly interesting address on the treatment of pneumonia. Dr. Thomas S. Cullen, of Baltimore, contributed a very able paper on the uterine myomata and their treatment. On the morning of the third day there was held a discussion on arteriosclerosis, which was opened by Dr. H. B. Anderson, of Toronto, with a paper on the etiology and pathology of this condition. This was followed by a paper on the cardiac aspect, by Dr. J. W. G. McKay, Oshawa, Ont.; Dr. John Caven, Toronto, dealt with the renal aspect and Dr. Hugh McCallum, London, Ont., with the cerebral aspect. Dr. J. C. Connell, Kingston, contributed to the ophthalmic lesions, while Dr. John L. Davison, Toronto, contributed a paper on therapeutics. The following officers were elected: President, Dr. J. F. W. Ross, Toronto; Secretary, Dr. Charles P. Lusk, Toronto; Treasurer, Dr. Andrew R. Gordon, Toronto.

Amalgamation of Trinity and Toronto.—Matters have progressed to a very favorable degree as regards the amalgamation of these two medical schools. A joint agreement has been reached by the faculties of the two universities, which, it is understood, has been signed by

the representatives of both faculties, agreeing to amalgamate, and it now remains for Trinity University at an early meeting of that corporation to consider the terms of federation of the two universities and thus wind up the proceedings for one large medical faculty in connection with the provincial university, the University of Toronto. As Toronto Medical Faculty has a student body of 400 and Trinity Medical College one of about 250, the combined forces will make a very large medical school for this city.

Chief Coroner for Toronto.—The Ontario Government, during the session of the Legislature just closed, has created in Toronto the position of Chief Coroner and has appointed to the position Dr. Arthur Jukes Johnson, the well-known medicolegal expert. Now, when any medicolegal case is referred to any of the associate coroners, he will immediately report to Dr. Johnson, who shall determine whether or not any inquiry shall be made and will direct what coroner shall have charge of same. This will do away with the wire-pulling which has been indulged in in the past in connection with coroner's inquests in Toronto. The office carries with it an honorarium of \$1,500.

GENERAL.

Appointment of Dr. Horsley.—Dr. J. Shelton Horsley, of El Paso, Texas, has accepted the Chair of Principles of Surgery at the Medical College of Virginia, Richmond, Virginia. He has also been elected to one of the positions of attending surgeon to the Memorial Hospital.

Honor Men at Yale Medical School.—The anniversary exercises of Yale Medical School were held in the College Street Hall on June 23. The address was by Prof. Henry Mills Hurd, Superintendent of the Johns Hopkins Hospital, Baltimore, on "The Duty and Responsibility of the University in Medical Education." Honors to members of the Medical School graduating class were announced as follows: Degree of Doctor of Medicine, Cum Laude: Charles E. Farr, Athol, Mass.; Albert H. Garvin, Wethersfield, Conn.; Herbert C. Gibner, Bridgeport, Conn., and John E. Lane, Hadley, Mass.

The Campbell Gold Medal for highest rank in the examinations of the course was awarded to Herbert C. Gibner, Bridgeport. The Keese Prize for the most meritorious theses was won by John H. Bailey, of New Haven.

Yellow Fever in Mexican Ports.—The sanitary authorities are taking stringent measures to stamp out yellow fever, which exists in nearly all the Gulf ports. Progreso and Merida are the worst affected, but Tampico has an epidemic which is causing anxiety there. Several unsanitary houses have been burned. The bodies of three victims, who tried to escape being sent to the Lazaretto, were found on the outskirts of Tampico yesterday.

Obituary.—Dr. F. J. E. Rohmer, one of the best known retired physicians of the South, died at Mobile last Tuesday, aged ninety-one years. He was born in Alsace and was one of the founders of the Charity Hospital in New Orleans.

CORRESPONDENCE.

TRANSACTIONS OF FOREIGN SOCIETIES.

British.

CLINICAL AND EXPERIMENTAL OBSERVATIONS UPON GENERAL PARALYSIS—TWO MYOMATA UTERI WEIGHING NINE POUNDS—OVARIAN PAPILLOMATA.

Dr. LEWIS C. BRUCE, at a meeting of the Ophthalmological Society, held May 8, 1903, read a paper entitled "Clinical and Experimental Observations upon General

Paralysis." He said that in his previous communication to the Society, his conclusions were: (1) that general paralysis was a disease directly due to poisoning by the toxins of bacteria, the point of attack of which was through the gastric and intestinal mucous membrane; (2) that the poisoning was probably a mixed one, but the *Bacillus coli communis* was apparently one of the noxious organisms; and (3) that the result of treatment by means of serum taken from cases of general paralysis in a condition of remission and injected subcutaneously into early progressive cases pointed to the fact that some form of serum treatment was the proper treatment for this as yet incurable disease. Further observations had led him to modify the second conclusion, that the *Bacillus coli communis* was a cause of the disease. He now believed that the *Bacillus coli* infection was a secondary one. In the Perth District Asylum recent acute cases of general paralysis were rarely admitted, and so the material for observation was therefore limited. Since the commencement of these observations, Dr. Bruce has treated in all eight general paralytics with serum derived from general paralysis in a state of remission. Three of these patients had made apparently complete recoveries. The patient in Case I had been discharged for three years and earned his livelihood as a saddler; the patient in Case II had been discharged for eighteen months and was working in the Post Office; and the patient in Case III had been discharged for nine months and worked as a dyer. Of the remaining five patients, one was relieved and had shown no progressive symptoms for four years. The remaining four were not improved. The leucocytes were regularly examined in two of the patients who recovered and in all the patients who did not improve. The only change noted was a continuous hyperleucocytosis during the period when the serum was being administered subcutaneously in 2 cm. doses daily. In the patients who recovered the leucocytosis fell to below 10,000 per cubic millimeter of blood and the percentage of polymorphonuclear cells was generally below 50. As according to his previous observations the blood of 70 per cent. of general paralytic patients contained an antibody which agglutinated the *Bacillus coli communis* in low dilutions of 1 in 10, he treated two cases with antibacillus coli serum. Neither patient benefited by the treatment. The leucocytosis induced by the subcutaneous injection of antibacillus coli serum was often very high, running to 40,000 per cubic millimeter of blood. Dr. Bruce next investigated the leucocyte changes which occurred in the various stages of the disease. In his first series of observations, he had already recorded that in patients suffering from general paralysis there was a recurrent hyperleucocytosis. In a second series of observations made in six cases the fact of a recurrent leucocytosis was confirmed. Stained films showed that in the first stage of the disease the polymorphonuclear leucocytes were generally present in a percentage of 70 or 80. As the disease advanced these cells diminished in number until in the third stage of the disease they might fall as low as 40 per cent. As the polymorphonuclear cells decreased the leucocytes increased. An eosinophilia was invariably present at some time during the course of the disease and varied from 15 to 5 per cent. of the total number of leucocytes. This eosinophilia was a sign that the disease was active; it was not present in patients who had passed into a definite remission or who had recovered. It was a fact that the course of general paralysis was often temporarily arrested if the patient suffered from some intercurrent inflammatory condition such as erysipelas. To ascertain if this arrest of the disease were due to the leucocytosis induced by the inflammation or to the specific antibodies formed in the blood and tissues, Dr. Bruce made the following observations. Three cases of gen-

eral paralysis, all with acute symptoms, were treated with small doses of *Streptococcus pyogenes* toxin. The organism was grown on nutrient broth for a week at a temperature of 37° C. The culture was then killed by heat. This was then tested on rabbits to ascertain its virulence. Each patient then received half cubic centimetre doses of the fluid subcutaneously. Case I, a male, showed no reaction in temperature, pulse or leucocytosis and there was no mental benefit. Cases II and III both gave a mild febrile reaction (99° and 99.8° F., respectively). The pulse in both rose to 100; slight leucocytosis was present (14,000 and 15,000 per cubic millimeter). The polymorphonuclear cells rose above 80 per cent. and the eosinophiles fell to one and two per cent. The most marked result, however, was the mental effect. Both patients became quiet and sensible recognized that they were ill, and submitted to treatment. The effect of the first injection passed off in a week, when it was noted that the percentage of eosinophiles was again increasing in the blood. A second and third injection gave exactly the same results and then the patients evidently became immune, as further treatment yielded no results. After a due interval the toxins of the *Staphylococcus aureus* prepared in the same way were injected, but the subsequent reaction was feeble and gave no definite results. The fact that in Case I, where there was no hyperleucocytosis there was no beneficial action, and that in Cases II and III with a hyperleucocytosis with high polymorphonuclear percentage, there was distinct benefit, would seem to indicate that the increased polymorphonuclear leucocytosis was the active agent in assisting recovery. The fact of the rapid reaction to the toxins injected and the immunity quickly produced, as well as the failure in reaction of the *Staphylococcus aureus* would point to the fact that the toxins of the streptococcus had produced some antibody in the blood and tissues which temporarily raised the resisting power of the patients. To ascertain if the increased leucocytosis alone were capable of arresting the disease, Dr. Bruce took Case I of the previous series, in which the patient had not benefited by serum treatment and observed the leucocytosis, temperature and pulse for several days. Two cubic centimeters of terebene were then introduced subcutaneously but with hardly any reaction and without benefit to her mental or physical condition. In the case of a male patient the reaction was marked; the leucocytes went up to 29,000 per cubic millimeter of blood; the polymorphonuclear cells were 80 per cent. There was great physical and mental benefit. In two months he was discharged to his friends. Two cases were treated with antistreptococcal injections of 2 cm. daily for over a month, and both benefited temporarily but relapsed on discontinuance of the treatment. Dr. Bruce thought that the benefit was largely due to the leucocytosis induced. The results of these observations were, he thought, evidence against the theory that general paralysis was a disease due primarily to the breaking down of the brain neurons as the result of syphilitic poisoning, and they supported the more recent view that the disease was due to the direct action of bacterial toxin which, when temporarily overpowered, allow nature to put into force the constant attempts at recovery which were so marked a feature of the disease. Syphilis, plumbeum or great mental and physical strain were undoubtedly the predisposing factors, but without the direct bacterial attack there would be no such disease as general paralysis.

Dr. SAVY, at the Royal Academy of Medicine in Ireland, Section of Obstetrics, April 24, 1903, showed the following specimens: (1) Two myomatous uteri weighing 9 pounds. Ovarian Papillomata. The patient was first seen on Oct. 18, 1902. The tumors, which were confounded with the uterus, on bimanual examination, were

supposed to be myomata. When seen on April 28 the abdomen was very much distended with ascitic fluid and the patient was suffering intense pain. Abdominal celiotomy was performed Oct. 31. The abdominal peritoneum was studded with secondary growths and the omentum was a mass of disease. The two cystic ovaries, which were universally adherent were removed with much difficulty, and also the omentum. The patient recovered. (2) The patient from whom the specimen was removed was first seen in February, 1901. Though she had long passed the menopause a sanguineous discharge from the uterus had been going on more or less for two months. Curetting was advised, but was declined, and she was not seen again until six weeks previously, when a fungous growth was observed to be protruding from the os uteri. Vaginal hysterectomy was performed. The operation was a difficult one owing to the friability of the uterus, but it was successfully carried out and the patient made a good recovery. It was remarkable that an operation was still possible two years after the probable commencement of the disease. (3) This patient suffered intense distress from pelvic pressure, and, the uterus being found enlarged and retroverted, the symptoms were attributed to the displacement. Abdominal suspension of the uterus by Kelly's method was performed, but owing to the obstruction of the bowel, the abdomen had to be reopened, and the cause of the obstruction was found to be an adhesion of the rectum to the cervix, which it had been found impossible to separate at the original operation; the uterus was therefore allowed to return to its former position and the abdomen was closed. Her sufferings were so great that she was obliged to relinquish her employment, and when the removal of the uterus was suggested she readily consented to have the operation performed. About a fortnight subsequently Dr. Smyly performed a supravaginal amputation and the patient made a good convalescence.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON ORTHOPEDIC SURGERY.

Meeting of April 17, 1903.

T. Halsted Myers, M.D., in the Chair.

Septic Joint Disturbance?—Dr. Ely presented a young man with peculiar hip symptoms for diagnosis. E. P., eighteen years of age, jeweler. No history of tuberculous or of venereal diseases. About three years ago had malarial fever, which lasted one week and disappeared upon the exhibition of quinine. No history of infantile disease or of pneumonia. Two years ago, while in swimming, felt sudden pain in right knee. About two weeks afterward began to walk lame, and has been lame ever since. Pain grows better and worse, being especially severe after a hard day's work. Does not bother him at night. Eats well and sleeps well. Has also had pain in left shoulder for eighteen months. Only one centimeter atrophy of thigh. The limb is in flexion of 150 degrees, and in abduction and external rotation. Limitation of motion in all directions, and marked muscular spasm. Actual shortening of three centimeters, and apparent lengthening of $2\frac{1}{2}$ inches. The left arm is slightly atrophied, and motion in left shoulder joint is restricted. The X-ray of hip shows nothing.

Dr. Dowd said he thought the case suggested septic joint disturbance, if there are septic conditions of a very mild grade, which affect the joints, causing ankylosis.

Dr. Townsend said that at the Johns Hopkins Hospital, a new method of employing tuberculin was used for ascertaining positively whether a condition was due to tuberculosis or not. The results had proved successful in over 90 per cent. of the cases. He considered this case one of rheumatoid arthritis.

Dr. Northrup said that he made 65 injections at the Presbyterian Hospital in connection with pulmonary lesions. With adults the results were good, and they were published. In the children's wards, he got no reliable results at all. Could not tell whether the reactions were caused by constipation or tuberculosis.

Dr. Myers said that in St. Luke's Hospital he had used tuberculin for diagnosis in children, and had obtained typical reactions where tuberculosis existed. He had found no reaction in rheumatic cases, or in one case of hysterical joint, but had several times obtained the reaction in cases which seemed to be specific. Possibly these were cases of mixed infection. Dr. Myers considered Dr. Ely's case rheumatic rather than tuberculous, neither the glands nor spleen were enlarged.

Dr. Ely said, in closing the discussion, that the case had been a puzzle to him. The patient had been in plaster. He said it was a question now what to do with him.

Dr. Dowd presented the following cases:

Deformity of the Finger.—*Case I.*—Deformity of finger following injury received when a small child, resulting in cicatrice which bound the finger down. Skin grafting, as advocated by Wolf in 1875 was employed, and lengthening of tendon, as advocated by Dr. Hibbs. The graft was taken from the girl's thigh, the entire thickness of the skin. The finger is nearly straight, which illustrated the fact that a joint can be held an indefinite length of time in a flexed position without becoming ankylosed in that position.

Paralysis of the Tibialis.—*Case II.*—Paralysis of the tibialis anticus muscle. Patient came to hospital eighteen months ago. At that time had marked valgus. The tendon of the tibialis anticus was split; part of it was left attached to its own muscle, the other part was brought across and fastened to the extensor tendons. A brace was worn for a time. Patient has now a good gait, and walks almost squarely.

Tendon Transplantation.—Dr. Dowd presented another case of tendon transplantation. Patient had a varus due to paralysis of the peroneal muscles. The tibialis anticus was split; the lower end was brought around and attached to the peroneus longus. When the patient raises his foot the new tendon may be seen. The varus is pretty thoroughly corrected.

Dr. Townsend said he had been impressed by the fact that good results were not always noticeable, in these cases of tendon transplantation, at first, but were observed later on which good results were largely due to subsequent treatment. He thought this quite as important as the operation. Patients could not be operated on and turned loose, as the tibialis anticus could not be expected to support the foot entirely.

Syphilitic Osteitis.—Dr. Townsend presented a case of syphilitic osteitis of spine and hip. This girl was born in Ireland. Had ulcer on the leg when about six years of age, which was healed by means of some form of ointment used. After that disappeared, the deformity of the spine, which he exhibited, appeared. Two years ago, when she came to the hospital, she had two ulcers on the left leg. They were of the type described as characteristic of syphilis—round, punched out, hard, large, and discharging offensive pus. Family history entirely negative, nothing to indicate disease in father, mother or other children. He did not give much thought to ulcers on account of condition of left hip. The hip presented symptoms of hip-joint disease,

flexion, abduction, tenderness, sensitiveness, very little motion. She was put on iodide of potassium and mercury later, and ulcers healed. Brace was applied, and gait now shows one hip is as good as the other.

He thought that few cases of hip-joint disease could be ascribed to syphilis, but in his case the symptoms which were apparently due to that disease, cleared up on administration of remedies usually given for it. He thought the condition might be due to a neurosis.

Dr. H. L. Taylor said that he had observed that when cases cleared up on mercury, the conditions might usually be ascribed to syphilis. He thought that even if syphilis were present, however, there might be other lesions, not of such a nature. He had watched Dr. Townsend's case, however, and thought that the hip, skin lesions and spine were of syphilitic origin.

Dr. Nathan said that he had known syphilitic joint lesions to get well without treatment, and he had been treating a case of double tuberculous hip disease, in which the child walked about in three weeks after using the iodides.

Typhoid Spine.—Dr. Hibbs presented a case of typhoid spine. Boy, age eighteen years. On August 12 developed typhoid fever. Got up from bed September 23, and felt well until November 4. Then in the right lumbar region had a feeling of soreness. The pain increased in severity, extended to left lumbar region and also over the spinous processes. He remained in bed seven weeks. The pain extended to both legs, but was not so severe as in the back. On the night of November 4 he had a chill, followed by fever and delirium. There was no delirium the next morning, and he did not notice any fever. December 12 he got up from bed with some pain; he could not stand alone, and had lost considerable weight and he noticed that the spine was curved, the convexity being to the right, extending from ninth dorsal to last lumbar vertebra. There was marked rigidity, sharp spasm and pain upon pressure. Brace applied on December 24. He visited the hospital January 9; the lateral curve was not so pronounced; there was less pain, which was limited to the left side and he walked more erect. On January 23, when next seen, there was less lateral deviation of spine, though there was still pain on left side. February 6 the spine was straight, and general condition much improved. At no time was there any interference with control of bladder or rectum. Though at his first visit to the hospital the deep reflexes of the knee were exaggerated, now they are normal.

Diabetes Insipidus, Arthritis of Knee.—Dr. Hibbs presented a second case for diagnosis.—Girl, age 8 years. Admitted to hospital March 10, 1903. No family history of tuberculosis or syphilis. The child has had measles, otherwise has always been healthy. The patient suffered two years ago from some vague gastic disturbance after which the left knee became swollen, accompanied by loss of function and by pain in the knee. The swelling persisted and other joints became enlarged and temporarily painful and sensitive. The mother is not able to give any more details of the history. The child was found to be fairly well developed and apparently anemic. Central incisors notched slightly but corresponding in no way to the Hutchinson type. Chest, negative, except for a soft systolic murmur heard best in the third interspace on the left side and apparently hemic in character. Abdomen, superficial veins rather well outlined. Patient is capable of distending the anterior abdominal walls to a remarkable extent, so that the more movable viscera are apparently displaced downward, the liver and spleen becoming easily palpable. She is likewise capable of throwing the belly walls into the scaphoid position. If allowed to do so, she will permit urine to collect in the

bladder in such amount as to distend this viscus above the umbilicus, after which she will pass about 26 to 30 ounces of urine. She is thirsty and will drink inordinately if permitted to do so, even resorting to the water in which she is bathed. Her appetite is not particularly good. The blood examination reveals a secondary anemia of the chlorotic type. Temperature, pulse and respiration entirely normal. Urine, daily amount, between 95 and 100 ounces; very pale; faintly acid; sp. gr. 1.001; faint trace of albumin; no sugar; numerous pus cells; large numbers of desquamated epithelium—round and squamous; no casts; few urates. There was found to be thickening of the synovial membrane and effusion in left knee-joint, also involvement of the joint of one finger, and phalanx of another. The arc of motion was not limited.

Hypertrophy of Fringes of Synovial Membrane.—Another case presented by Dr. Hibbs. Girl, age eleven years. Past and family history unknown. Patient comes to hospital (March 6, 1903) stating that, for six months past, she has been suffering pain in both knees, affecting more particularly the left, and coming on after exertion. She states that she is able to walk 15 or 20 blocks without inconvenience, but that any greater walk results in severe pain in the knees. She has noted that, while skating, her leg has become suddenly stiff as if held by a cord. During this period the leg is slightly flexed on the thigh. After a few moments' rest the limb resumes its former posture. There is no limitation of motion in either joint. On examining the joint, one can feel something like rice bodies, which are painful on pressure. An apparatus has been applied, limiting motion in extremes of both flexion and extension, with lateral support.

Internal Derangement of the Knee-Joints.—Also introduced by Dr. Hibbs. Came to Orthopedic Dispensary four days ago. His mother said that for the past three weeks the child had been limping occasionally, and complaining of pain in the knees. Found in each knee a small piece of movable cartilage, which is assumed to be the cause of the difficulty. A loose cartilage was also found over the tip of the external malleolus of ankle, and over the tip of the elbow. They are new growths, or have been chipped off.

Extreme Rachitic Deformities.—Dr. Myers presented this case. Colored child now four years old. Has never walked erect. Lies in bed always. Progression is peculiarly apelike; child squats on its haunches and then advances on all fours, the thumbs being turned backward. Feet are in marked valgus; anterior curvatures of tibiae and femora; coxa vara; prominent abdomen; thorax narrow and horizontal in curvature of ribs, which interferes with action of heart and lungs, rachitic rosary, curvatures of clavicle, cubitus varus, enlarged radial and tibial epiphyses, craneotabes. Previous history unknown. The case was presented especially on account of the extreme muscular weakness, persisting so long, and after most of the sensitiveness has disappeared.

DISCUSSION OF DR. HIBBS' CASES.

Diabetes Insipidus.—*Case II.*—Dr. Northrup said that in regard to the fusiform formation of the shaft of the bones of the fingers, it was almost impossible to tell, by looking at the fingers, whether the cause was osteoperiostitis due to syphilitic or tuberculous processes. Almost all fusiform shafts turned out, on autopsy, to be tuberculous; simply from morphology it would be impossible to determine. He thought retroperitoneal, tuberculous nodes, could account for the abdominal appearances.

Dr. Freeman thought that tuberculosis would account for almost all symptoms shown by the child. The

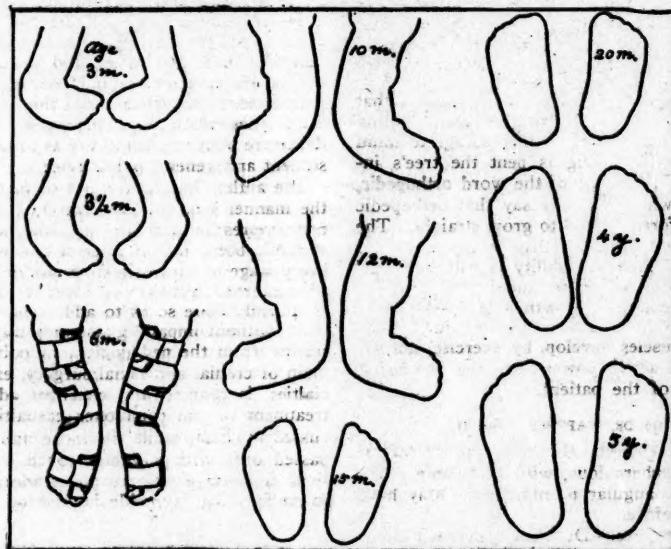
joints of the fingers showed tuberculous disease; it has peritonitis and tuberculous pancreatitis. The same changes might be due to syphilis. He thought children seemed to have tuberculosis generalized.

Dr. V. P. Gibney said that he had heard that tuberculosis in children was generalized, but he thought the disease would not go on to tuberculous pancreatitis and involve the mesentery glands without also affecting the brain of the child. The tendency in these cases was rather to develop meningitis. Dr. Taylor said the case did not impress him as tuberculous. He thought a number of conditions were against that diagnosis—the joints showed that they contained fluid, but did not show much of anything else. The bones did not seem to him to be enlarged. He thought chronic white swelling had a distinct physiognomy of its own which this case lacked. He thought it true that fusiform swellings of the phalanges were in 99 cases out of 100 tuberculous, but this case did not show the ordinary features of such swellings. He thought syphilis would account

after he had taken violent exercise—long bicycle rides, etc. The disease probably existed before, but was aggravated by the exercise. This boy does not seem to be particularly neurotic. Dr. Ely said he had seen a case of typhoid spine a short time ago, with osteitis of the vertebrae, with marked swelling in back, extreme sensitiveness, muscular spasm and limitation of motion.

Congenital Dislocation of Left Hip, and Hip-disease in Right Hip.—Dr. Napier presented a case which he showed for its unusual condition, and also to get the opinion of the section of the feasibility of reducing the congenital dislocation of one hip while there was tubercular disease in the other. Six years ago, operation had been advised for the dislocation, but refused. The child was not seen again until about 2½ years ago, when the diagnosis of tuberculous hip disease was made. This is still in active stage.

Dr. Lorenz saw the case at the King's County Hospital, and suggested the advisability of reducing the dislocation, putting it up in the usual position, and then



The figures show the increase in the size of a child's foot by natural growth, of which advantage may well be taken in the correction of talipes equinovarus.

for the fluid in the abdomen. The cases of floating cartilages, and movable bodies in several joints, he thought interesting and rare. He said he thought the case showing loud crepitus in the knees on motion was one of hypertrophied synovial fringes, rare in children, not so in adults. Goldthwaite has given the results of his study of these cases, with symptoms—sometimes intermittent, sometimes continuous, sometimes mild, sometimes very severe. They are called dried joints. These hypertrophied fringes may be felt at location of crepitus; if the joint should be cut down upon they would probably be found.

Dr. Northrup said the thickening was in the shaft, showing it was true thickening of the bone.

Dr. Hibbs said that he had been treating the case with mercury and iodide, as a means of diagnosis. He could not see any improvement. Had then applied apparatus as explained above.

Dr. Ely said that he had been questioning the boy with typhoid spine closely, and found he had had considerable discomfort ever since his attack of typhoid fever, but had not been bothered by great pain until

including the right hip in the plaster spica, letting the child walk on the right leg. If the left hip should be abducted, the other is usually adducted, in order to bring the leg down so the patient can walk, and that would not be a good position for hip disease. The child is nine years old.

Case II.—This was also presented by Dr. Napier, who at first thought it to be a typical case of posterior curvature with lateral deviation. On examination on table, back was found to be a little stiff, as is often the case in posterior curvature. Slight swelling to the right of the dorsal spine, containing fluid, apparently following a fall he had in playing leap-frog, when he landed on his head. Since the swelling has appeared for the last two or three months, he has moaned at night, tired easily, and for the last month or six weeks has had a little difficulty in walking, and falls frequently. There is increased knee-jerks, and ankle clonus on both sides. At night has pain in dorsal spine. No angular prominences in spine. It is stiff in dorsal region, there is a round kyphosis, hardly more than round shoulders. On account of other symptoms, it

seems to be a case of spinal osteitis. The boy is now having difficulty in holding urine.

Effect of Growth in a Case of Clubfoot.—Dr. A. B. Judson.—The chart presents the history of a case of talipes equinovarus. Treatment was begun when the boy was three months old. There had been no previous treatment. The outlines were taken at 3 months, 3½ m., 6 m., 10 m., 12 m., 15 m., 20 m., 4 years and 5 years. The case is not presented for the purpose of illustrating the method pursued, or as an illustration of unusually successful treatment. The patient was before the Section in March, 1901, when the last outline was taken, one year after the restoration of normal shape and ability and the cessation of treatment. Fortunately such results are common, and becoming more common all the time, now that it is recognized that operative and forcible measures are not required in cases of this kind if the surgeon is freed from the necessity of being in a hurry and has the assistance of intelligent attention to the patient at his home. The chart is presented because it shows the increase in size which the foot acquires by its natural growth and brings prominently to view a fact lying at the base of orthopedic practice in general, the fact that our results in prevention and cure are to be sought and found in so managing the case and so equipping the patient that his growth will be the principal curative agent leading to symmetry and ultimate ability, which brings to mind the old saying: "As the twig is bent the tree's inclined," and also the derivation of the word orthopedic, in accordance with which we may say that orthopedic practice leads the deformed child to grow straight. The success in these cases is greater than it appears to be on the surface. Restoration of ability is still more important than restoration of shape, and in this also we are assisted by the patient's growth and development. If the bones are held in normal relation to each other the ligaments and muscles develop, by exercise, normal passive strength and active power with the increasing activity and weight of the patient.

DISCUSSION OF DR. NAPIER'S CASE II.

Dr. V. P. Gibney thought the case one of lateral curvature, primarily tuberculous, with paraplegia. Abscesses came with no angular prominences. May have had Pott's disease before.

Etiology of Rickets, etc.—Dr. Freeman made some remarks on this subject. He discussed the causes that had been suggested and the experiments that had been carried out to demonstrate that one or another of these causes was a real factor in the etiology of this disease, and showed that most of these experiments had given negative results. He then related certain observations made in New York by himself and others, on babies living in the tenements and in certain institutions, showing the remarkable frequency of this disease in institution children, even when their surroundings were hygienic and they were fed for the most part on breast milk.

Dr. Northrup said the first thing to do in the study of the cause of rickets was to clear the deck of all old theories which were not of service, and only consider those that were. He had found that babies having best of care in hospitals were as subject to the disease as those brought up in tenement houses.

Dr. V. P. Gibney said he did not know what caused rickets, and was simply there to admire the work of Dr. Freeman in collecting such valuable statistics.

Dr. Taylor admired Dr. Freeman's work, but thought the statistics were taken from far too few cases, and from far too limited a class of infants, to draw any very wide generalization. He thought results must be repeated by different observers for a number of years,

before generalization could be made. He had noticed that dirty tenement children were no more subject to rickets than the well-cared-for, and thought the trouble was with the food. He thought sterilized more digestible than raw milk.

Dr. Nathan thought that where infants were nursed by their mothers, rickets were of less frequent occurrence.

BOOK REVIEWS.

SURGICAL EMERGENCIES. The Surgery of the Head. By BAYARD HOLMES, B.S., M.D., Professor of Surgery in the University of Illinois, Professor of Clinical Surgery in the American Medical Missionary College, Chicago; Attending Surgeon to the Chicago Baptist Hospital. D. Appleton & Co., New York.

ALTHOUGH intracranial neurectomy of the fifth nerve and amputation of the tongue for carcinoma are scarcely to be classed as coming under the head of emergency surgery, still the present volume displays so many excellencies both of matter and arrangement that some trifling inconsistencies may readily be condoned. The preface seems to indicate that this is the first of a series of volumes which are to discuss the regional surgery of the entire body in such a way as to be most useful to the student and general practitioner.

The author has set himself to present the material in the manner most likely to produce a vivid and permanent impression and has succeeded in producing a most readable book, full of interest and profit for readers in every stage of professional evolution. The introduction of numerous histories of more or less dramatic cases is skilfully done so as to add point to the didactic material without impairing its continuity and is a valuable feature from the pedagogic standpoint. The entire domain of cranial and facial surgery, exclusive of the specialties, is covered and excellent advice given for the treatment of the commoner casualties, which are discussed in detail while the more unusual conditions are passed over with a lighter touch. Numerous illustrations and several colored plates adorn the text and help to confirm the favorable impression the volume makes.

VEASEY'S OPHTHALMOLOGY. A Manual of Diseases of the Eye. For Students and General Practitioners. By CLARENCE A. VEASEY, A.M., M.D., Demonstrator of Ophthalmology in Jefferson Medical College, Philadelphia. Lea Brothers & Co., New York and Philadelphia.

THIS is a valuable addition to the list of smaller handbooks on special subjects. A fair working knowledge of the diseases of the eye is as necessary to the general practitioner as the ability to use the stethoscope and we know of no other book which presents the outlines of the subject in so practical a way as this. The task of selection is great in the preparation of such a work and the author has been most successful in keeping his material within the limits of a manual without sacrificing completeness. Much is due to the very happy general arrangement and the systematic and concise way in which each subheading is discussed. The hand of the experienced teacher as well as of the skilful clinician is evident on every page and the result is very near perfection both from the standpoint of the student who seeks clearness and directness of exposition, and of the practitioner who requires a reference book for counsel in every-day work. Unlike many books of this class written mainly as text-books, this is a practical treatise and the department of therapeutics has been accorded

unusual space so that one will never turn to it in vain for hints as to treatment.

The illustrations are excellent and, for the most part, well chosen, though we think that albuminuric retinitis and optic neuritis, being the two conditions which the non-specialist is most likely to desire to recognize in his patients, might have been given a place among the colored plates rather than some of the rarer lesions so figured. The demonstration of tubercles in the choroid also sometimes forms the crucial point of a difficult differential diagnosis and a black and white cut, at least, of the condition should be included.

THE AMERICAN YEAR BOOK OF MEDICINE AND SURGERY.

Being a Yearly Digest of Scientific Progress and Authoritative Opinion in all Branches of Medicine and Surgery. Drawn from Journals, Monographs, and Text-books of the Leading American and Foreign Authors and Investigators. Collected and Arranged with Critical Editorial Comments. Under the General Editorial Charge of GEORGE M. GOULD, M.D. Surgery. W. B. Saunders & Company, Philadelphia, New York and London.

THE present volume of this excellent annual is well up to the high standard of its predecessors and offers a very satisfactory conspectus of surgical progress during the past twelve months. The collaborators have shown nice discrimination in their selection of material and the references bear witness that the most important surgical publications of the old and new worlds have passed under their eyes. The editorial comments for the most part are apt and give an added value to the sections they discuss while the abstracts themselves are models of concise but lucid expression.

Sections of especial importance are those on the surgery of the peritoneum and intestines, including an admirable description of the operation on President McKinley, and those on gynecology and obstetrics which are remarkably comprehensive.

The illustrations accompanying more important articles are reproduced in full; particularly interesting is the series of plates showing the results of Kelly and Brödel's study of the blood supply of the kidney with a view to the technic of nephrotomy. The index is comprehensive and the book is almost a necessity to every one engaged in active work.

TREATISE ON DISEASES OF THE EYE, NOSE, THROAT AND EAR. For Students and Practitioners. By various authors. Edited by WILLIAM C. POSEY, A.B., M.D., Professor of Ophthalmology in the Philadelphia Polyclinic, and JONATHAN WRIGHT, M.D., Surgeon to the Manhattan Eye and Ear Hospital, etc. Lea Brothers & Co., New York and Philadelphia.

THIS is the best book with which we are acquainted in the English language on the cognate subjects which it treats. Unlike many composite works of similar construction we believe that the editorial supervision of the work under consideration is very well done. The contributors, among whom are such well-known specialists as Alderton, Birkett, Casselberry, Cheatle, C. F. Clark, E. T. Collins, Crockett, Duane, Ellett, Gifford, Goodall, Hopkins, Miller, William C. Posey, Reeve, C. W. Richardson, E. A. Shumway, W. K. Simpson, T. H. Spencer, E. G. Starr, W. N. Suter, S. St. Clair Thompson, C. A. Vesey, J. E. Weeks, C. A. Wood and H. Willian, such an array of eminent authorities speaks for the scientific character of the book.

Comparisons between the different chapters are invidious and we therefore hesitate to pick out any that commend themselves especially to our praise. In fact all of the articles are of a high order. The illustrations

are numerous and well chosen, and taken all in all we know of no work of similar character that fulfills its many useful functions. The new edition by the publishers in two volumes meets the only plausible criticism of the first edition, i.e., its bulkiness.

TRANSACTIONS OF THE AMERICAN ORTHOPEDIC ASSOCIATION. Sixteenth Session, Held at Philadelphia, June 5, 6 and 7, 1902. Appendix. The published writings of the present active members. References to orthopedic literature published from May 1, 1900, to July 1, 1902. Volume xv. Published by the Association. Philadelphia.

THIS collection of papers read at the last session of the American Orthopedic Association contains much that is of interest to the general surgeon and to the family practitioner. Orthopedic surgery, dealing as it does essentially with chronic diseases and stretching its treatment over long periods of time, often demands the co-operation of the family practitioner whose skill is required in the case of intercurrent maladies. General practitioners and surgeons may very properly be expected to add a Year Book of Orthopedics to their libraries and these transactions afford a most satisfactory résumé of recent work in this specialty. Papers of particular interest are those on "Internal Derangements of the Knee-joint," by Peckham; "Congenital Dislocation of the Hip" and "A New Treatment for Fracture of the Neck of the Femur," by Whitman; and a very practical and profusely illustrated article on "Shoe Deformities," by Bradford.

BACTERIA IN DAILY LIFE. By Mrs. PERCY FRANKLAND. Longmans, Green & Co., New York.

POPULAR treatises on bacteria and on their relationships to processes in the phenomena of every-day life are neither numerous nor well written. The present volume, however, is an exception to this generalization. It is written by one who is thoroughly acquainted with the subject from a standpoint that is distinctly non-medical and in a style which is charming. We can recommend it most highly both to the technical reader and to the physician, particularly as a work that he can recommend to his patients who are interested in bacteriology from the lay standpoint.

LABORATORY EXERCISES IN BACTERIOLOGY. An Outline of Technical Methods Introductory to the Systematic Study and Identification of Bacteria. Arranged for the Use of Students by ALLEN J. SMITH, M.D., Professor of Pathology in the University of Texas. P. Blakiston's Son & Co., Philadelphia.

LABORATORY manuals in bacteriology grow apace, but very few of them take up the study from the standpoint of the present author. His point of view is systematic bacteriology, a standpoint which we feel is absolutely essential in any modern treatise devoted to the subject of the science of these micro-organisms, and we thoroughly believe with the author that the best way to approach the subject of bacteriology, even for the medical student, is to enter through the channel of systematic bacteriology.

Bacteria being plants, their classification should be a purely botanical study. Their later physiological action and the detailed study of pathological forms, which are of so much interest in medicine would best be considered as a by-product of certain phases of these plants. It is only in this manner, we believe, that a comprehensive view of the study of bacteria can be gained and, therefore, the present outline is particularly to be commended.